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British Standards

THE high reputation of British engineering products in foreign countries is in itself a sound sales point, but the question has often been raised as to whether our standards are not better than they need be for meeting competition in the world's markets. Do we lose more in this way than we gain by our good name for quality and durability?

An informed and illuminating commentary on this subject is contained in correspondence that has passed between Mr. C. Le Maistre, director of the British Standards Institution, and the British Chamber of Commerce in Argentina.

Probably the most interesting example from the electrical point of view is that of the permissible temperature rise of generators and motors. The British practice is to quote for a maximum temperature rise of 40 deg. C., whereas American and German manufacturers rate machines at the same output which have a 50 deg. rise; this makes the British machine perhaps 15 per cent. larger than those of our principal foreign competitors.

We believe that our method is the sounder, as it permits of an overload of 25 per cent. for two hours, which experience of industrial conditions shows to be in most cases a very desirable feature. As Mr. Le Maistre says, it is not a question of putting forward smaller frame sizes with a higher temperature rise, but of recognising what the two ratings mean. If both are properly understood, the appropriate size of motor can be selected for its particular purpose at either rating.

We can quite see the difficulty of convincing an Argentine client that the heavier machine is the better, but the difficulty can be overcome by offering machines with a corresponding 50 deg. rating marked on the name-plate. That is quite a legitimate way out and one which is adopted already by many of our leading firms, but we believe that it should be held in reserve and that every attempt should first be made to explain the practical advantages of machines built in accordance with the recommendations of the British Standard Specification.

That this is not asking too much is shown by the action of some Continental manufacturers in exporting motors rated on the British basis in order to meet the requirements of foreigners who have had experience of the advantages of this method.

It is not as though the British Standard Specifications laid down the principles of design of ideal machinery. They merely incorporate the technical conditions which our leading engineers and manufacturers have agreed to regard as good general practice. They do not, except in special cases, call for the highest possible class of material or practice, although they do exclude the use of material of doubtful quality.

In letting in some light on a subject regarding which expressions of opinion—many ill-informed—have been rife, Mr. Le Maistre has done a good piece of work. We think he proves that if our manufacturers show readiness to take into account the views of the foreign buyers and show patience in explaining their own, they can secure business without lowering their standards.

The Best—but not Enough of them!

IT has been so frequently drilled into the public in trade reports and in platform oratory that Britain is appallingly deficient in good salesmanship that we suppose we ought to believe it. We are somewhat shaken in that conclusion, however, by the statement that Britishers individually are the finest salesmen in the world, made by Dr. W. G. Fern at a conference of works directors and managers held a week or so ago at Oxford. His experience in many English-speaking lands overseas proves that there is no equal to the British salesmen; his complaint is that there are not enough of them to go round. This criticism is as old as British electrical export trade, yet in the past that trade has not made

a bad showing. It might have been much better had there been more live men in the field. If our manufacturers lay themselves out to employ a larger body of foreign trade seekers they will not have much difficulty in finding suitable material. It may be, probably is, true that we have not always sent out the right man to do the work. Does it necessarily follow that a good engineer is also a good salesman? Of course not; but a qualified traveller sufficiently trained to appreciate the technical side is a valuable agent whether for securing export trade or for boosting the sale of electricity at home. In our overseas trade efforts in pursuit of electrical concessions and orders of magnitude the combination of financial, commercial and engineering personnel and resources has often brought off contracts where isolated action would have failed.

New Switchgear Required

MR. R. P. SLOAN'S inspiring appeal to members of the Electrical Power Engineers' Association to do, individually and collectively, all they could to increase the use of electricity—an appeal that met with a prompt response from the president, Mr. D. J. Duffy—was backed by some telling figures. He showed what could be done towards providing work of a profitable nature if the amount of electricity used for domestic purposes were increased by only 10 per cent. There is, however, much work that should be, and is being, done, irrespective of increased output; we have pointed out several instances in recent months. Now comes the news of the Met.-Vick. contract valued at close on £300,000 for the 66-kV switchgear at Fulham power station. The heavy rupturing capacity of this (1½ million kVA) accounts for the relatively high cost. The substitution of circuit breakers of higher rupturing capacity in power stations, sub-stations and industrial works, brought about largely by grid inter-connection, should give considerable scope to our manufacturers. Thus Manchester Corporation Electricity Department is considering raising the duty of the 6.6-kV switchgear at Stuart Street power station to 750,000 kVA at a cost of about a quarter of a million. A few more contracts of this kind, if they can be regarded as types of the new work that will be required on undertakings in different parts of the country, would effectively dispel the feeling that now that the grid is completed the outlook is gloomy for the manufacturers of the larger electrical equipment.

Pearls Before Swine?

THE pig is assuming greater importance in Great Britain nowadays, and some might think that he is even being pampered. His well-being is being studied with the greatest care and his sty is being equipped with "every modern convenience," including, in at least one case, electric heating. This case (reported on page 467) is at Preston, Lancs, where Mr. W. Dagger, a prominent local pig-breeder, speaks very highly of the advantages of electricity in the rearing of young pigs. His experience has shown that by warming their abode by electricity these youngsters have a vastly better chance of surviving in the worst of weather, and he has become an enthusiastic electrical advocate in consequence. He advises farmers to install as many plugs as they can to make electricity available for many of their operations. This is another example of the satisfied consumer proving the best propagandist for electricity.

Garden Floodlighting

CONSIDERING the large number of electrical engineers who are garden lovers, it is surprising that more have not gone in for small floodlighting schemes. The expenditure on the installation need not be great, and the energy used is only about that taken by a small electric fire. Summer time may now be over, but that need not prevent one doing something about it. From what Mr. C. C. Paterson tells us there appears to be much to be gained from floodlighting in winter as in summer, and the householder can enjoy his garden, even on the wettest evening, after his return from the city.

The Informal Meetings

THE Informal Meetings of the Institution of Electrical Engineers are designed to give opportunities for an expression of their views to members who are reluctant to take part in the discussions at the ordinary meetings, and the average age of those present is noticeably lower. Discussions are opened by speakers with special knowledge of the subjects reviewed. The President, Mr. P. V. Hunter, will open the first meeting of the coming session on October 30th by asking whether underground cables can be used economically for 11-kV distribution. It would seem to be more difficult to make out a case for 11-kV than for 6.6-kV cables in comparison with overhead lines. At 6.6-kV the use of cables has sometimes avoided the need for transformation from generation pressure to 11-kV, which would have been necessary with overhead lines in view of voltage drop due to reactance, but these are special cases in which excavation of the ground has been easy. Other subjects that will be discussed within the next three months are power factor improvement, hot-cathode lamps, luminous-gas signs, X-ray work, and speed regulation of small a.c. motors—all matters of topical moment.

Our Domestic Special

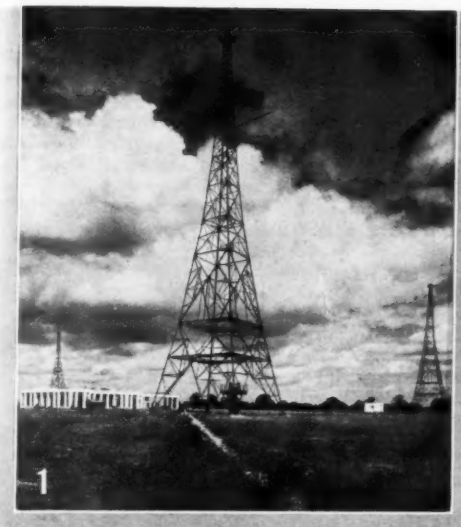
Next week's ELECTRICAL REVIEW will be devoted to

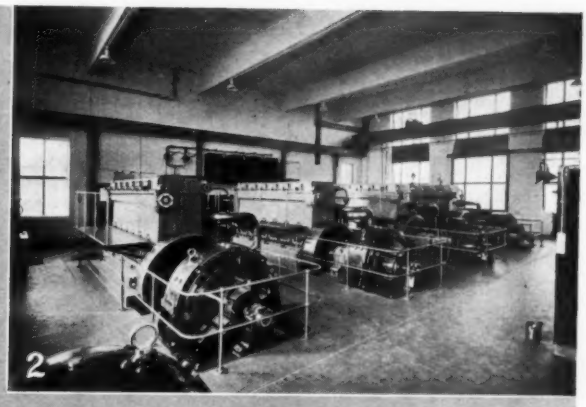
Electricity in the Home

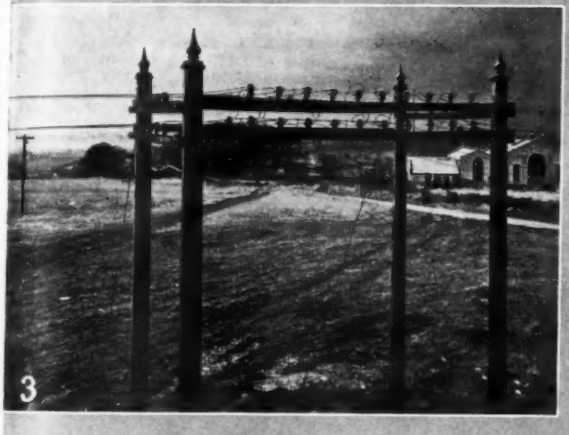
It will contain a comprehensive classified guide to the many domestic electrical aids now on the market and will thus provide a convenient and ready work of reference during the whole of the coming season.

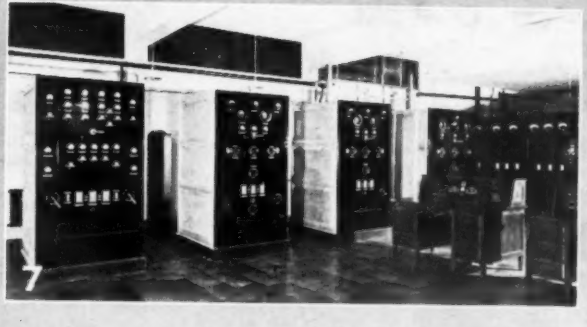
B.E.A.M.A. and Australian Tariffs

READERS will be interested to learn that Mr. I. V. Robinson, a member of the staff of the British Electrical and Allied Manufacturers' Association in London, is shortly to appear before the Australian Tariff Board. He will place before it arguments in favour of a reduction of the British preferential tariff on certain electrical items in accordance with the spirit of the United Kingdom-Australia Agreement signed at Ottawa. The question of the duties imposed on electrical goods by the Australian Government has been engaging the attention of B.E.A.M.A. for some time past. We congratulate the Association upon its decision, and venture to hope that the readiness with which the Board welcomed the idea of the proposed visit and agreed to facilitate an early hearing of Mr. Robinson's statement augurs well for success. The electrical industry has received the cordial support of both the Department of Overseas Trade and Mr. R. W. Dalton, H.M. Trade Commissioner in Australia (who, as readers of the ELECTRICAL REVIEW have good reason to know, has been a close student of British electrical affairs for many years) in this matter. Mr. Robinson left London on Friday last.







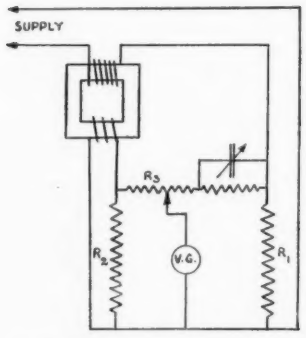


Some of the British Broadcasting Corporation's Stations

1. Brookmans Park. 2. The power house of the West Regional. 3. The Empire station: an aerial-feeder termination unit (5XX building in the background). 4. The West Regional transmitter hall. 5. The Scottish Regional transmitting station. 6. The insulated base of one of the 500-ft. masts of the North Regional. 7. A transmitter, control desk and part of the power switchboard at the Empire station

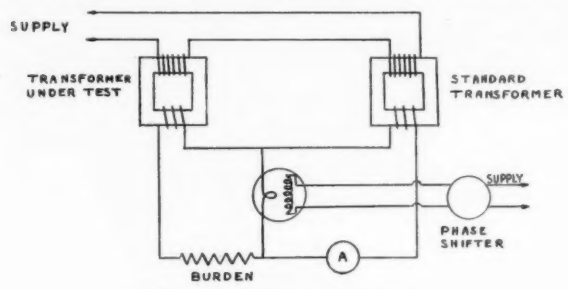
Current Transformer Testing. By A. G. Powell, A.M.I.E.E.

AN accurate knowledge of the errors of current transformers is an obviously important factor in a.c. measurements, particularly those of energy, where both the ratio and phase-angle errors must be taken into account. Methods of testing current transformers may be divided into two basic groups—absolute and comparative. The former involves the direct measurement of the errors, and the latter the comparison of the errors of the transformer under test with the known errors of a standard transformer.



A simple arrangement for a bridge test

A well-known absolute method involving the use of an a.c. potentiometer is that in which two standard non-inductive resistances having the same ohmic ratio as the nominal ratio of the transformer under test are connected, one in the primary circuit and the other in the secondary. With a perfect transformer, the potential differences across the ends of these resistances would be equal and in phase, but due to the transformer errors a difference between these voltages will exist. This difference is measured by means of an a.c. potentiometer by resolving it into in-phase and quadrature components compared with the primary. The ratio error is then given by the ratio of the in-phase component to the drop in the primary shunt, and the phase error (in radian measure) by that of the quadrature component to this drop.

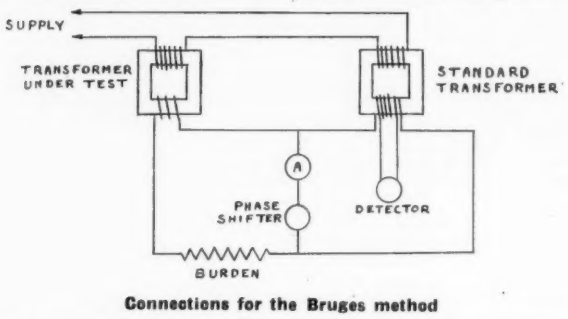


The Silsbee comparison method

A further method of this class is the bridge method. Many variations are possible, but as it necessitates the use of standard resistances and a standard variable condenser it is, like most other absolute methods, somewhat expensive as regards apparatus. In the simple arrangement illustrated, the primary and secondary resistances R_1 and R_2 are connected in series and shunted by a high resistance R_3. A standard variable condenser C is connected across a portion of R_3 corresponding to the primary resistance, and a vibration galvanometer is connected between a variable point on R_3 and the common point of R_1 and R_2. This arrangement forms a bridge connection, and when a null indication is obtained on the galvanometer by adjusting the shunting capacity, the errors of the transformer can be calculated from the value of the latter and the ohmic resistance of the four arms of the bridge.

Advantages of Comparison Methods

Generally speaking, the comparison methods call for less expensive apparatus than the absolute methods, and possess the advantage that the burden connected in the secondary circuit of the transformer under test can be arranged as desired, whereas with absolute methods a considerable non-inductive burden (consisting of the standard resistance) must be included, thus rendering the testing on a small inductive burden difficult. The sensitivity of these methods is limited by the allowable voltage drop in the standard resistances.



Connections for the Bruges method

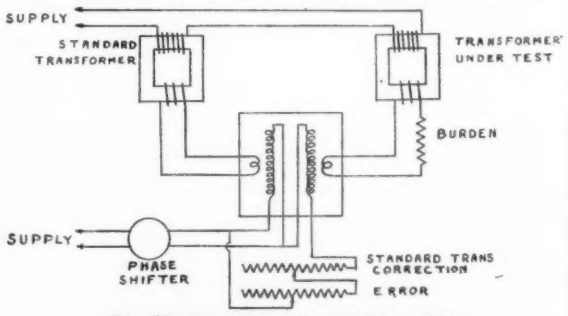
One of the best known of the comparison methods is that due to Silsbee, the connections being as shown. The test and standard transformers are connected in series, and under these conditions, and but for differences existing between the errors of the two transformers, the secondary currents would be equal in magnitude and phase. The difference current therefore represents the vectorial difference between the errors, and is passed through the current coil of a wattmeter, the potential coil of which is connected to the supply through a phase-shifter. By adjusting the latter, the in-phase and quadrature components of the difference current may be measured. The biggest possible source of error is that due to the impedance of the wattmeter current coil, which must be of a low value in order to prevent current diversion effects, otherwise the spill current will not correctly represent the difference of the transformer errors.

[*Elliott & Fry*

Mr. A. G. Powell, the author of this article, is a member of the technical staff of the Gramophone Co., Ltd; he was formerly on the engineering staff of British Celanese, Ltd.

In the Bruges method the test and standard transformers are connected in series and a phase-shifter is connected to the secondary terminals of the standard transformer; the latter has an additional winding to which some form of detector, either a galvanometer or milliammeter, is connected. The phase shifter is adjusted to reduce the flux in the core of the standard transformer to zero, as indicated by the reading on the detector, when the phase error of the standard transformer disappears, and the errors of the transformer under test can be calculated from the instrument readings.

The Shotter method is particularly suitable for the routine testing of instrument transformers. The primaries of the test and standard transformers are connected in series, and the secondary currents are passed through the current coils of a two-element indicating wattmeter, the desired burden resistance being included in the test transformer circuit. The potential coils are energised in parallel from the same source of supply as the primaries, through a phase-shifter, that of the transformer under test having a variable resistance (consisting of a special resistance box) connected in series. The polarity of the wattmeter connections must be such as to set up opposing torques in the two elements; any difference between the secondary current of the transformers is indicated by the wattmeter being deflected from zero. The amount of adjustment of the resistances required to bring back the wattmeter to zero is an accurate indication of the difference between the secondary currents.



The Shotter scheme for routine testing

In practice, one portion of the resistance box is used to make an initial adjustment to compensate for the known errors of the standard transformer, the other portion being calibrated in percentage errors of the transformer under test. The determination of phase errors is carried out by using the phase shifter to give a leading voltage of known angle; the resistance box indication then becomes a combination of phase and ratio errors which are separated by calculation.

The Built-in Electric Fire. By W. K. Fleming

A new phase of domestic heating

IN an article in the ELECTRICAL REVIEW of August 28th, 1931, on "The Design of Electric Fires," I suggested that too much attention had been given to the portability of the electric fire and that, for certain applications, a real demand existed for the built-in or permanent design of electric fire. Perhaps in some measure the comments offered at that time inspired manufacturers in this direction, but at any rate electric fires of this type have been developed to such an extent that whereas previously very few were made, they are now available in a wide range of types and designs.

A radical change is taking place, particularly in new houses, in the trend of electric heaters which are now being designed as an aid to the decorative architecture of the home. In the application of electric heating to modern homes our manufacturers have shown commendable vision and originality, and built-in electrical equipment is now available which is strikingly successful in its modern conceptions of design and usefulness.

A point of much importance is that such a scheme of heating is not confined to the luxury house, for here again the enterprise of manufacturers has ensured that the small house can obtain the necessary equipment at the right price in a variety of tiled, slate, composition, or metal fireplaces with specially designed inset fires to suit.

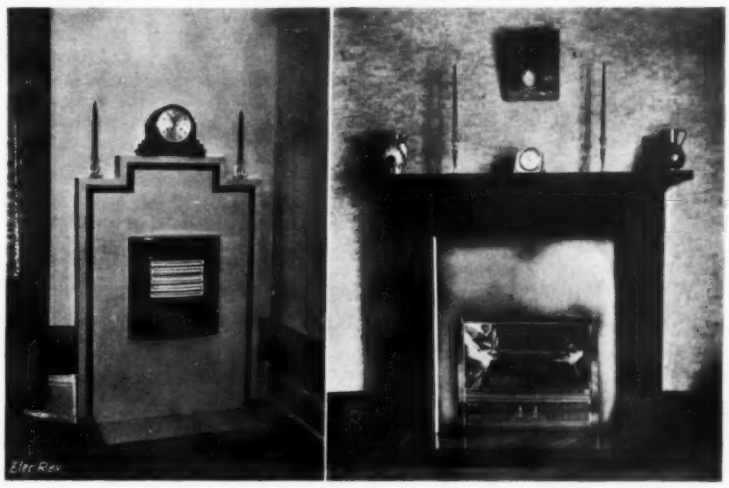
The old slogan—"Warmth where you want it," which we have used so much in developing electric heating, still applies to the built-in fire. The builder will find that the fire can be let into the wall at any convenient point or even built across the corner of a room. In some designs the recess is as small as ½ in., which permits the fire to be fitted without cutting away the brickwork or breeze. Again, if the available space is limited, or other considerations of design or decoration in the room require it, an inset panel fire can be fixed practically flush with the wall; by eliminating the mantelpiece, hearth, &c., an exceedingly simple yet decorative and effective arrangement is provided.

Profitable Business

Supply authorities and contractors would do well to consider carefully this application of the electric fire; there is profitable business in it from many points of view. Apart from new houses there is a vast field to be explored in *existing* houses for the application of built-in electric fires in the thousands of homes without electric heating of any kind, and the thousands more with inadequate electrical installations that are capable of being modernised, but more effort will be required on our part to bring about the necessary transformation.

Only in certain instances will the owners or tenants of existing houses consider the complete removal and reconstruction of fireplaces. The problem is rather one of *conversion*. One has only to view the progress of the gas industry in converting existing fireplaces to built-in gas fires to realise the possibilities of this aspect of heating, and at the same time to acknowledge that such permanent gas installations make it much more difficult for electric heating to be installed subsequently.

The following observations, based on my own experience, reveal some details which arise in dealing with this class of business. Every dining-room which has an open coal fire-



Left: An old mantelpiece replaced by a thick plywood surround. Right: A fireplace covered in with a metal plate into which the fire fits flush; there is also a hearth plate to match

place presents an excellent opportunity for a built-in electric fire, but most of the following references to the dining-room apply equally to bedrooms, and even to other public rooms in certain circumstances. The dining-room is used for only a few hours each day, and the advantages of electric heating under these conditions particularly are so great that it is not a very difficult matter to persuade the householder or his wife to adopt it. Many such rooms are, of course, already wired for heating, but the extent of the equipment is often a portable fire sitting rather self-consciously in front of a background of empty blackness, or another "all-purpose" electric fire rescued temporarily from, say, a bedroom, and sometimes unsuited not only in appearance but also in heating capacity to its purpose.

Two cases in which the original tilework has been retained and added to for closing the grate opening

There are many arguments in favour of the built-in electric fire, and it is our business to put these before the prospective customer. If some form of fire is already used, then the consumer has at least appreciated the advantages of electric heating, and the subsequent procedure is easier. If the room is not wired, we have first of all to sell the idea of electric heating. Once electric heating has been decided upon, the question of the built-in electric fire can be approached.

Advantages to the Consumer

What are the advantages from the consumer's point of view? First, there is the convenience of being able to heat the room at a touch of the switch. A permanent electric fire will be economical at any reasonable heating rate, for the actual hours of use, even in the winter time, are relatively small, and the heat is available whenever it is wanted and for just the time it is needed. The banishment of the coal fire means for that room the elimination for all time of smoke, dirt, ashes, &c., and the labour inevitably associated with the old order of things. In place of this there will be cleanliness, freshness, and healthy radiant warmth. Again, old-fashioned fireplaces are generally ugly and badly designed. They are often quite out of keeping with the rest of the room, which may have

become modernised gradually in other respects. There is a strong argument here in favour of the built-in electric fire which, with little trouble and at moderate expense, can be arranged to alter entirely the appearance of the coal-fire grate.

Once the consumer is won over to electric heating, and admits the advantages of a permanent electric fireplace, the outstanding point to be met is the question of cost. The manner of carrying out the installation will depend on circumstances, and wherever possible complete new built-in equipments should be fitted. The owner of a house will probably be prepared to consider a somewhat more elaborate arrangement than a tenant, who invariably has a disinclination towards doing anything for his landlord's house. A great proportion of the business, however, lies in tenanted houses, and there is no reason why simple conversion installations cannot be carried out to meet the needs of this class of consumer.

Simple Conversion Schemes

An inexpensive arrangement for converting an existing fireplace is to fix a metal plate so as to cover completely the entire opening, tiles included, within the three sides of the mantelpiece. The metal plate is cut so that the inset fire may fit flush in position; it is also an easy matter to fix a metal hearth plate to cover the hearth tiles and thus complete the conversion. Both plates should be suitably finished to harmonise with the fire. In this way the old fireplace is effectively screened, and a modern electric fireplace gives new atmosphere and character to the room.

The change can be accomplished with a minimum of inconvenience and expense; there is no cutting away, plastering, or retiling; the plates have simply to be screwed in position, possibly to a light framework which may require to be made in some cases. If the depth of inset electric fire permits, the coal grate may not even need to be removed, but if this should be necessary, it is only the work of a few minutes. An advantage from the tenant's point of view is that in the event of his leaving the house he can, if desired, dismantle the electric fire and leave the fireplace in its original state. A fireplace converted in this way is illustrated.

The mantelpiece was quite presentable and required no alteration, but the interior was old-fashioned, with highly coloured tiles sloping inwards to the iron grate. A complete change to a modern setting was quickly and effectively made by fitting an oxidised silver metal back plate to the back framework of the wooden mantelpiece, fixed with small wood beading round the top and sides for neatness. A similar plate was fixed to the tiled hearth, and the chromium flush-fitting fire was then merely pushed into position in the opening cut in the back plate. The kerb in the picture, by the way, is of wood, painted to match the mantelpiece, and recessed on the inside so that it covers the ends of the metal hearth plate and tiles.

Another interesting conversion of an old fireplace to electric heating is also shown. The problem here was how to modernise a small nondescript-looking coal fireplace in a bedroom which was about to be redecorated and refurnished by a new tenant. The construction of the fireplace did not permit of any form of inset electric fire being fitted to it; the cost of removing it entirely and rebuilding a new fireplace would not be considered; yet it had to be improved in view of the modern scheme of renovation for the rest of the room.

The solution adopted was to remove the small mantelpiece shelf and to build a new fire surround of thick plywood in simple modern design round the old fireplace, which was thus completely covered. This surround was then painted in cream enamel and orange line decoration to match the colour scheme of the walls and woodwork in the room. An antique brass electric fire was screwed on the face of this surround, separated about ½ in. from it by heat insulating distance pieces; the fire itself—which is of standard design—has also a sheet of asbestos fixed inside behind the fire bars. Three large holes drilled through the wooden surround immediately behind the fire provide a suitable means of ventilation, and incidentally enable the flexible cable from the fire to pass conveniently behind the surround to the side at the bottom, and thence to the wall plug. A wooden hearth plate and kerb, coloured to match, complete the arrangement, which was carried out very simply and inexpensively.

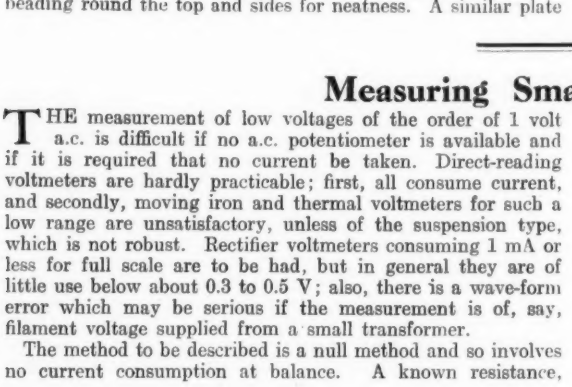
Occasionally it happens, especially with the more modern type of coal fireplace, that by removing the grate and suitably building up the tiling work to match the existing tiles, an effective setting is arranged for the electric fire. When converting coal fireplaces the chimneys should be cleaned and weatherproof covers should be fitted on the chimney tops.

In conclusion, it may be said that while the portable electric fire will continue to have a large sphere of usefulness, it is equally certain that modern schemes of decoration and furnishing in both new and existing homes will call for initiative and resource on our part so that our product will be applied in the manner best suited to the circumstances. The built-in electric fireplace, with its attractive advantages of decorative arrangement, convenience, and cleanliness, offers great possibilities of further electrical development in the heating field.

Measuring Small A.C. Voltages

THE measurement of low voltages of the order of 1 volt a.c. is difficult if no a.c. potentiometer is available and if it is required that no current be taken. Direct-reading voltmeters are hardly practicable; first, all consume current, and secondly, moving iron and thermal voltmeters for such a low range are unsatisfactory, unless of the suspension type, which is not robust. Rectifier voltmeters consuming 1 mA or less for full scale are to be had, but in general they are of little use below about 0.3 to 0.5 V; also, there is a wave-form error which may be serious if the measurement is of, say, filament voltage supplied from a small transformer.

The method to be described is a null method and so involves no current consumption at balance. A known resistance,



A multiplying selector switch method

tapped for convenience, carries a current measured by an ammeter. The current is of the order of 0.5 A and a moving-iron ammeter for this range is quite satisfactory and can easily be of first-grade accuracy. As the resistance and the current through it are known, the voltage drop across it can be calculated from Ohm's law, as at 50 cycles the reactance can be neglected. The unknown voltage is now balanced against the voltage across the resistance through an a.c. galvanometer—conveniently a rectifier microammeter. The current through the resistance is varied until the galvanometer is at zero and the ammeter is then read. The ammeter may be scaled directly in volts and then a direct-reading test, embodying a null balance, is produced, having an accuracy within a small percentage.

To extend the range downwards it is convenient to tap the resistance and use a selector switch. In this way multiplying factors of any value may be used. The figure shows a switch to multiply by ½ and ¼. If the total resistance is 8 ohms and the ammeter of 0.5 A range, 4 V across the resistance will give full-scale deflection on the ammeter with the switch at 1. Similarly the other switch positions give ranges of 2 and 1 V, whilst an extra tapping at ¼, or 1 ohm, would give a range of 0.5 V full scale. By suitably choosing the resistance and the ammeter range any other range or ranges may be obtained. The above values are convenient, as an ammeter reading to 0.5 A is a common range and the required 4 V is obtainable from the secondary of a bell transformer having a 5-V winding.

A rheostat of the order of 80 ohms maximum resistance is convenient to adjust to zero on the galvanometer. Instruments used in the apparatus described comprised a Ferranti a.c. galvanometer (0-750 microamperes) and moving-iron ammeter, with a range from 0 to 0.5 A.

The measurement is thus made in terms of a resistance and an ammeter reading, the latter being of a range that may easily be checked and not subject to temperature error as would be a low-reading voltmeter. In practice it may be found that the galvanometer will not read zero, but only a minimum point is obtainable. This is quite in order and shows that the two supplies are not exactly co-phasal. The bell-ringing transformer has its primary suitable for use on the local mains. An application of this apparatus is to the measurement of the volt drop across the series coils of a.c. meters.—E. H. W. Banner.

Some Driving Forces in the Industry: Dorman & Smith, Ltd.

1. Mr. S. H. Chatterley, director. 2. Mr. H. G. Baggs, chairman and managing director. 3. Mr. T. Atherton, secretary. 4. Mr. W. Litherland, estimating and sales department. 5. Mr. G. D. Oubridge, chief draughtsman. 6. Mr. E. Clarke, buying department. 7. Mr. W. E. Garratt, Northern Counties sales representative

Silence in Electrical Machinery. By "Designer"

NOISE is considered especially undesirable in such places as on board ship, in hospitals, or in public offices, where the minimum of disturbance is essential. On board ship the supply is usually d.c. Many hospitals also generate their own power from house sets which are usually d.c. owing to their small size. In public offices the type of supply is governed by the conditions obtaining in the district in which the buildings are situated, but as the main requirements are lifts, pumps, and fans, and as these are usually variable speed units, a d.c. supply is preferable.

In this article, only d.c. machines will be considered, and these lend themselves more readily to the curing of noise than a.c. motors, where after all remedies have been tried noise sometimes still persists owing to the much smaller air gaps of these machines.

Direct-current machines with their salient poles and commutators often give quite appreciable noise in the form of a hum varying in pitch, which according to its intensity is more or less undesirable. The type of noise, whether windage or magnetic, must first be determined by running the machine at full load and full speed, and then throwing off the load suddenly. If the note changes in strength it is due to a magnetic cause. If no alteration of the note is noticed then it is due to air noise; that is, the fan or bearing is the cause of the trouble.

Magnetic Hum

The magnetic noise is a definite pitched hum which varies as the load varies, and is produced by the "snapping" of the lines of force from the main pole tips to the teeth of the armature. There are three remedies for this fault which are more or less bound up with each other. The main pole tips may be chamfered to increase the reluctance of the magnetic path and also welded to ensure that the tooth plates, if slack, do not vibrate due to the magnetic pull between them and the armature teeth; this vibration gives out a definite note. Further within limits of speed, *i.e.*, in the speed tolerance limits, the air gap may be increased, thus increasing the reluctance of the path and decreasing the "snapping" effect of the lines of force between the poles and teeth. Another remedy is to skew the slots or teeth of the armature by one slot pitch so that when one end of the tooth is emerging from below the pole the other end is still under it. Then all the lines of force do not all pass from one tooth to another at the same instant of time.

Windage noise may be due sometimes to the speed of the machine and it may be necessary to decrease the fan diameter, thus cutting down the air delivery and noise. The reduction in air quantity may cause the machine to heat up above the allowable limit, and in that case it is best to substitute a lower-speed motor. The limit in speed for silent drives varies with the size of the unit, but in general speeds above 1,000 r.p.m. produce mechanical vibrations which may combine with fan noise to make the machine noisy and loosen mechanical parts.

Controversy has always existed as to whether trailing, radial or reaction brushes give the best results for silent running, but in modern machines it has been found that trailing brushes give the best results for machines running in one direction only; if the machines are reversible, as in lifts, radial brushes give good results. Among mechanical safeguards to ensure silence can be included journal bearings which run more silently than the ball and roller types. They must be used at low speeds and this again limits the r.p.m. of the set. Attention to the balance of the rotating parts, either by static or dynamic methods, during manufacture, and the secure bolting of the main poles to the shell by a sufficient number of bolts per pole will lessen the tendency to vibrate and help in producing "silent running" machines.

Customers who need machines for specially silent duty ought always to specify this condition and give the manufacturer a chance to submit a machine which will fulfil the requirements.

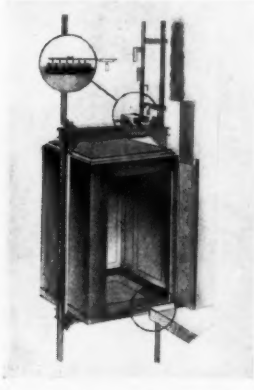
Electro-Osmosis and Ploughing

From investigations by F. Weber, of Munich, concerning the effect of electric current upon the power required to draw a plough, it appears that the tractive resistance is reduced about 19 per cent. by a d.c. of 1 A flowing from the coulter to the body of the plough. The requisite voltage depends on the construction and size of the tool, and can be reduced to from 60 to 80 V. The consumption of electrical energy is thus so low, says *Elektrotechnik und Maschinenbau*, as to offer no obstacle to practical trials. Earlier workers attributed the electrical reduction of resistance to ploughing to the endosmotic deposition of a lubricating film of water on the ploughshare. Apparently, however, the passage of current had also an effect on the energy required to displace the soil.

Modern High-speed Lifts.

By John Dummelow, M.A. (Cantab.)

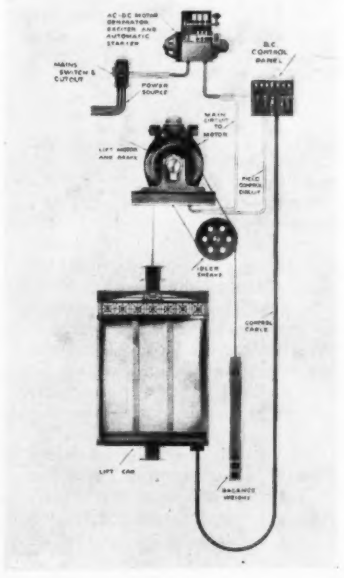
NOW that the necessity for centralised accommodation is causing new office blocks, stores, warehouses and so on to be built to ever-increasing heights high-speed lifts have become indispensable. The total distance from the sub-basement to the top floor may be over 200 ft. for a sixteen-storey building, and lifts will be required to transport both passengers and goods at a speed of about 450 ft. per minute. In order to realise the full benefits of rapid travel and thus obtain the highest possible carrying capacity, acceleration and deceleration must take very little time, while remaining perfectly smooth so as to avoid discomfort to passengers; in addition, the car must be brought to rest at the landings independently of any skill on the part of the attendant, if the combination of high speed and varying loads is not to necessitate frequent adjustment of the lift level subjecting the control equipment to considerable wear and tear.



Method of mounting inducer box and plates for automatic floor levelling

Discriminating control may be obtained simply and economically on the variable voltage system, which allows a load of 2,000 lb. to be accelerated to a speed of 450 ft. per min. in about two seconds. There are no jerks or jars, and rapid landings can be made with unvarying accuracy whatever the weight carried or the direction of travel. In this system each lift is provided with a d.c. hoisting motor supplied with current at (say) 230 V from a motor-generator set. By varying the strength and polarity of the generator voltage it is possible to control the speed and the direction of rotation of the hoisting motor and therefore regulate the movement of the lift. Four operating positions from creeping speed up to full speed are provided.

The reversing switches and the rheostat are connected in the field circuit of the generator and the hoisting motor, and the slight time lag between the variation of the current in the field circuit and the corresponding change in the strength of the magnetic field smooths out the acceleration and retardation of the lift car. The various circuits are opened and closed by means of contactor switches on a main control panel. When the lift is working the motor generator set is running continuously. By moving the switch handle to a running position a generator field current is established, causing the hoisting motor to run at a speed proportional to the voltage; the lift therefore accelerates as the voltage increases. The direction of travel can be reversed by changing the polarity of the generator field.



Complete variable-voltage equipment for a.c. supply

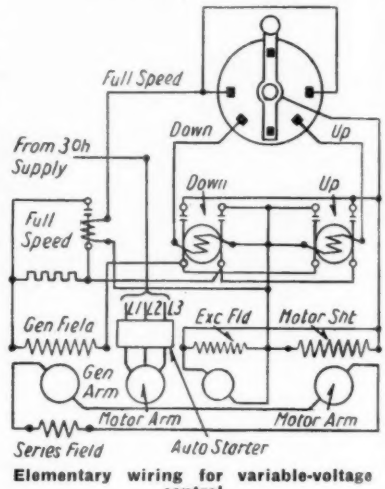
The Power Supply

A separate motor-generator set of simple construction is provided for each lift. The motor may be suitable for any type of power supply; both armatures are mounted on a common shaft and both frames are combined into a single rolled steel cylinder. On a.c. supply systems the d.c. for the generator field, hoisting motor field, and control and braking circuits is provided by mounting an exciter on the motor-generator shaft. The switch in the lift car controls an automatic starter, and an electrical interlock ensures that the intermediate contactor does not close until the motor generator is running at full speed and until the exciter (on a.c.) is at full voltage. A contactor in the armature circuit between the generator and the hoisting motor is arranged to close before operation begins and to open when the hoisting motor stops, so that the motor generator cannot build up its voltage on residual magnetism, and an indicating light in the car prevents the set being left running when the lift is not in use.

Variable voltage control can be used with gearless or high-grade geared lifts. For lift speeds from 350 to 700 ft. per minute gearless hoisting motors are necessary for high efficiency and smooth running; the ropes supporting the car and the counter-balancing weight pass over a grooved sheave wheel mounted directly on the shaft of a large slow-speed d.c. motor, running at about 58 r.p.m. A large-diameter electro-magnetic brake is used for holding the lift when the motor is de-energised. For lower lift speeds the hoisting sheave may be driven by a high speed motor through worm gear.

Automatic Levelling

Automatic floor levelling is provided by the use of small inducer coils and plates, which ensure that once the attendant has released the car switch handle retardation is automatically controlled. The inducer coils are mounted on top of the car, projecting over the edge, and the iron plates are fixed at suitable points in the hatchway. The return of the switch handle to the "off" position causes an alternating current to flow through some of the coils, and each primary coil induces a small alternating voltage in the neighbouring secondary coil, from which it is separated by a vertical slot. This induced effect, like that of a transformer with a very large air gap, causes no current to flow unless the voltage falls to a negligible value, and it is therefore transmitted to the first grid of a mains-operated amplifier.



Elementary wiring for variable-voltage control

As the lift moves up or down, the inducer plates pass successively through the slots between the coils, cutting off the induced voltage and setting up amplified currents that de-energise relays on the main controller. The car approaches the floor smoothly and rapidly and finally stops exactly at the floor level; landings are made in minimum time, and, as there is no metallic contact between the inducer coils and the plates, there is absolute silence in the car. If a heavy truck is run on to a goods lift, causing a slight drop due to rope stretch, it immediately relevels automatically.

A slow-down switch is provided at the top and bottom landings to bring the lift safely to rest if the attendant neglects to release the car switch. Over-travel and over-speed safety devices are fitted, and provision is made for emergency dynamic braking. If the supply to the motor-generator set or to the field of the hoisting motor should fail, the latter is automatically disconnected and the brakes applied.

Lift operating schedules can be improved further by using various control systems to stop the car automatically to answer calls (relieving the attendant of this duty), signalling systems and higher door-operating speeds. Where control or signalling systems are used, the intricate circuits involved can be operated by means of a "floor selector" as the car approaches, passes, or leaves a particular floor. This consists of two carriages with moving contacts passing over a vertical panel, which carries a number of fixed segments spaced to represent the various floor levels on a reduced scale; the carriages are moved up and down by means of a miniature lift gear on top of the selector. "Twyntorq" indicator motors, one driving the miniature lift gear and one driven from the actual lift, are electrically connected so that any movement of the lift in the shaft is exactly reproduced by the carriages on the selector.

High door-operating speeds can only be adopted if some means is found to ensure that passengers cannot be struck by the sliding doors. In a system recently introduced perfect safety is obtained by means of photo-electric equipment. An exciting lamp is fixed on one side of the lift entrance so as to illuminate a photo cell on the other side. As passengers enter or leave the lift the light beam is broken and the photo cell operates relays and prevents the doors being closed.

Seaside Lighting.

By W. J. Jones, M.Sc.

THE lack of industrial applications for electricity is common to seaside towns and interior health resorts; indeed their attractiveness to the residential population and to the visitor is in some degree due to the absence of industry and all that it implies. The supply engineer in such towns has not in general the advantage of the power load as a good " mixer " to the other uses of electricity in building load and improving load factor. There is, however, the potentiality of developing a peak load in the height of summer as well as in winter, and the electrical industry must take full advantage of the movement of the times to make British health resorts more attractive.

This movement, to strike a note of gaiety and amusement on a considered plan, deserves the closest consideration of electrical engineers in charge of hundreds of health resorts in Great Britain. Development schemes include setting up canoe lakes, open-air swimming baths, putting greens, miniature golf courses, and in all of these efforts there is ample opportunity for load development by introducing lighting.

The success of lighting seaside resorts depends upon a full understanding of its commercial value and its psychological effect on the visitor. The business aspect is more and more important to the extent to which the town depends upon a satisfactory influx of visitors, and efforts to provide cheerful amenities after dusk must be looked upon as an investment which few towns can afford to ignore. In some instances, apart from the general amenities, the provision of satisfactory lighting for amusements is capable of proving immediately remunerative. I have in mind an open-air swimming bath in which the number of people attending after 9 p.m. during the first three days proved sufficient to defray the cost of the installation, and it was estimated that six people attending per hour paid for the running cost of the lighting installation.

Spectacular Illuminations

For some years past the eyes of interested authorities have been directed towards the spectacular and remunerative illuminations at Blackpool; those responsible for the popularising of seaside towns are rapidly following suit. Apart from the fact that this is a summer-time load, it adds enormously to the prestige of the electrical industry. It is, therefore, surely desirable that schemes for electrical illuminations should be fostered on every possible occasion. Even the smallest seaside towns can afford some, and although in some instances it will affect the ratepayers' pockets by increasing the rates 1d. or 2d. in the pound, enhanced business invariably results.

To exploit this movement to the full requires more than selling the idea to the public authority. Apart from taking the town council to inspect similar towns, I would recommend the preparation of a crayon sketch of the front showing the proposed illumination in colour. The use of long lengths of striplite is only the beginning; there are surprisingly many opportunities for lighting trees, floodlighting rocks and gardens, and in this connection it is surprising what a few kilowatts will do. There is ample room in the presentation of such schemes for the use of pylons and luminous columns which can be built round existing lamp-posts.

This beginning by the town council can be used to inspire individual illuminations on the part of hotel proprietors, boarding house keepers and shopkeepers—inspire them to light their own gardens and hotel entrances in a spectacular manner. There are many methods of approach for developing such ideas, one of the most interesting being that sponsored by the Isle of Wight Company. This company has recently made a drive in this direction by making first of all a trial installation at one of its more important centres, at Ryde, and then inviting the town councils of the rest of the island to inspect it. Already it has been rewarded by the acceptance of schemes in Sandown and Ventnor, and it contemplates obtaining a considerable load in the other towns. For example, in Sandown, 20 kW of strip-lighting was installed along the front, including 1,000 15-W lamps. The company has also floodlighted the gardens at Ventnor.

Examples of private illumination. Left: The Crown Hotel, Ryde. Right: The Corner Café, Ryde

Even more interesting is the development of illuminations on private property. The company has a scheme for hiring a length of 25 yd. of twin cab-tyre cable with twenty-five lampholders and lamps for the summer season at a charge of 30s. The results of this activity are astonishing, the little town on the island providing a striking note of gaiety. Many facia boards of the shops are outlined with coloured lamps, and corner features of cafés are outlined. Coloured lamps outline windows of hotels, the load of the supply undertaking, due to private illuminations, being several times greater than that provided by the local authorities. Although the short hours of use on account of summer time provide the undertaking with only some 150 kWh per kW installed during the months of May to September, they represent a useful contribution to the revenue and load of the undertaking as a whole.

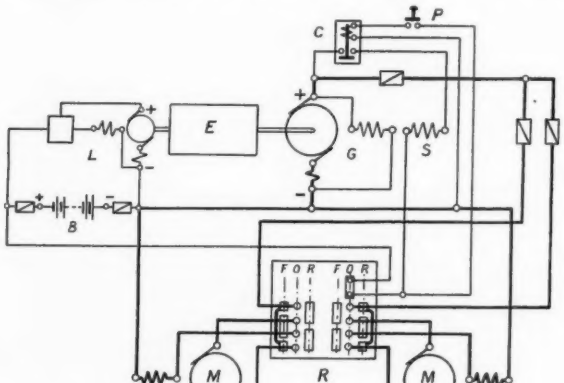
Shanklin provides an example of how this kind of load increases. During the last two or three years the lighting load on the front has increased several fold and is taxing to the utmost the 150-kW transformer installed only last year. It is confidently expected that in many instances other installations will be purchased outright, and in any event the arrangements are such that the material can be cheaply dismantled and used again another year.

Left: Festoon and floodlighting at the Ryde Pavilion and Eastern Gardens. Right: The Cascade Gardens, Ventnor

Speed Control for Diesel-electric Systems

The economical Gebus system

DIESEL engines ranging in output from about 50 h.p. up to more than 1,000 h.p. are being used to an increasing extent in road and rail transport. Their great advantage is the low consumption of safe and inexpensive fuel; their principal limitations are a relatively small overload capacity and the necessity for a variable-speed transmission in order that the speed and power of the prime mover may be maintained when the speed of the vehicle is low during acceleration or on gradients. With a mechanical change-gear transmission, the full power of the Diesel can be utilised only at the maximum speeds of the several gear ratios; with



A two-motor locomotive with Gebus control

electrical transmission, continuous variation of speed can be provided and the full capacity of the internal-combustion engine can be utilised at all speeds if a suitable method of control is installed.

If the engine be coupled to a d.c. generator with Ward-Leonard control the generator voltage can be varied so that the power delivered to the traction motors does not exceed the permissible output of the engine. This arrangement, however, involves the use of an exciter and appropriate control gear for varying the excitation of the main generator. The need for these auxiliaries is eliminated by the Gebus system of control developed by the Siemens Schuckertwerke concern of Berlin.

The Gebus generator is a self-excited shunt-wound d.c. machine, with a weak cumulative compound winding, the output of which adjusts itself automatically to that of the internal-combustion engine. No exciter or field controller is required. The engine is driven by the throttle alone, and its full output is then utilised automatically, at all speeds of the vehicle from standstill to maximum, by the electrical characteristics of the generator in conjunction with the small variations in engine speed corresponding to normal governing. There are neither regulating controls nor instruments to distract the driver's attention.

How the Gebus System Operates

The circuits of a two-motor locomotive with Gebus control are illustrated diagrammatically. The generator G is connected directly to the traction motors M except for the interposition of fuses and a reversing switch R. The heavy lines represent the whole of the main traction circuits and demonstrate the simplicity of the system. The engine E also drives a lighting generator L, but this, together with the battery B and the starting winding S, contactor C, and press-button P, may be regarded as auxiliaries independent of the main driving and control system.

The design of the main generator, as regards winding and magnetic saturation, is such that a small change in speed within the range of normal operation effects a large variation in e.m.f. At the light-load or idling speed of the engine, the generator does not excite and the vehicle therefore remains stationary, notwithstanding the fact that the engine is running and the generator connected to the motors through the forward or reverse contacts of the reverser, as the case may be. As the speed of the engine is increased, by opening the throttle, the generator excites and the vehicle starts smoothly from rest.

The full power of the engine, increasing with speed until full throttle is reached, is available for acceleration so that rapid as well as smooth starting of the vehicle is ensured. Thereafter, within the range of running conditions, the voltage of the generator varies steeply with speed, and the product of generator volts and amperes remains practically constant. The vehicle speed therefore varies automatically, in inverse ratio, with the tractive effort required by the load or gradient.

A Wide Range

The curves, reproduced from an article by K. Göttsche in *Fördertechnik u. Frachtverkehr*, illustrate the full range of operating conditions in a particular case. The inset diagram (*a*) shows the generator voltage as a function of speed, self-excitation occurring at a speed higher than the idling speed of the engine.

The curves *1*, *2*, *3* show respectively the external voltage-current characteristics of the Gebus generator at speeds of 1,100, 1,000 and 950 r.p.m. These curves differ materially from the normal characteristic curve of a shunt-wound generator, which is shown dotted at S. Beyond a certain point on the load curve, the excitation and armature current of a normal shunt generator decrease rapidly, but this is prevented by the weak compound winding in the Gebus machine, thus making possible high starting currents.

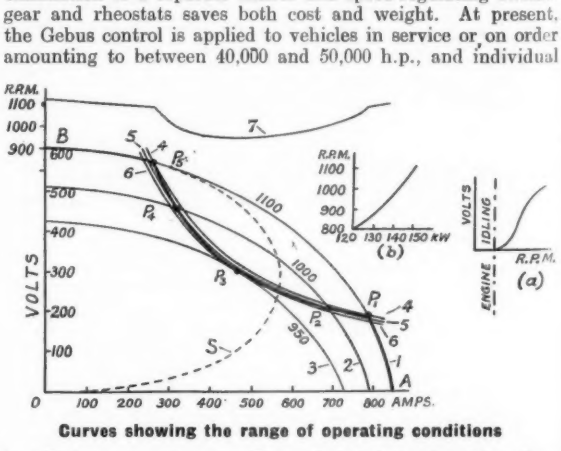
Starting commences at A on curve *1*, and as the vehicle accelerates from rest, the operating point moves from A to P_1, the current, and, therefore, the acceleration, remaining nearly constant. Curves *4*, *5* and *6* correspond respectively to constant power values of 150, 143 and 138 kW, as shown at (*b*). If the maximum output of the internal combustion engine be 150 kW at 1,100 r.p.m., then P_1 is the highest point at which the generator can operate on curve *1*. As the generator tends to operate above P_1 the electrical output becomes greater than the engine output, and the speed of the set falls slightly until balance is restored, *e.g.*, at P_2 at 1,000 r.p.m. and at P_3 at 950 r.p.m.

Beyond this point, the speed of the set can again increase to 1,000 r.p.m. at P_4 and 1,100 r.p.m. at P_5 where the 150-kW power curve is again reached. Thence, further decreases in current and tractive effort occur at nearly constant voltage, the engine meanwhile running at maximum speed, and maximum voltage being applied to the traction motors. The speed changes from A to B are shown by curve *7*. Actually, the decrease in engine and generator speed at intermediate values of current is less than shown by this diagram; it is, for example, about 5 per cent. in the power units of the "Flying Hamburger" of the German State Railway which operate on the Gebus system (see ELECTRICAL REVIEW, June 2nd, 1933, p. 775). This decrease is not considered to be of any practical importance.

Substantial Economies Effected

The essential features are the automatic maintenance of nearly constant maximum tractive effort during the acceleration period, and the constant power operation over a wide range of tractive effort under normal running conditions. If the full engine power is not then required the engine speed must be reduced (by the throttle), thus saving a great deal of fuel and wear.

Apart from its technical merits, the Gebus system offers obvious advantages with regard to capital economy. The elimination of a separate exciter and speed-regulating switchgear and rheostats saves both cost and weight. At present, the Gebus control is applied to vehicles in service or on order amounting to between 40,000 and 50,000 h.p., and individual



Curves showing the range of operating conditions

installations range from small petrol-electric trucks of less than 10 h.p. up to Diesel-electric locomotives and high-speed rail cars, for main line service.

The E.P.E.A. Dinner

Success of the Association's many activities

THE fifteenth annual dinner given by the Southern Division of the Electrical Power Engineers' Association (now always known as the "E.P.E.A. dinner") to the members of the National Executive Council was held at the King's Hall, Holborn Restaurant, on Saturday last, September 30th.

The toast of "The Guests" was proposed by the chairman, Mr. E. F. Hall, who referred to the presence of Sir John Brooke (vice-chairman, Electricity Commission), Capt. J. M. Donaldson (past-president, I.E.E.), the Mayor of Gravesend, Mr. J. F. Pringle (Admiralty), Alderman B. J. Samels (chairman, London and Home Counties J.E.A. and of the No. 10 District Joint Board), Mr. T. P. Wilmshurst (Electricity Commission), and Mr. Johnstone Wright (Central Electricity Board), in addition to those who proposed or responded to toasts.

The gathering indicated, as Mr. Hall pointed out, the close co-operation that existed between the manufacturing and electricity supply sections of our industry.

Mr. R. P. Sloan responded briefly on behalf of the guests and then proposed "The Association," which, beginning as an organisation for securing increased remuneration for the technical staffs of supply undertakings, had added such various activities as help for dependents of members, unemployment benefit, pensions, legal help, a well-thought-out and valuable correspondence course, and medical, dental and insurance services. The Association had also shown the managements of undertakings the importance of maintaining the good will of its members.

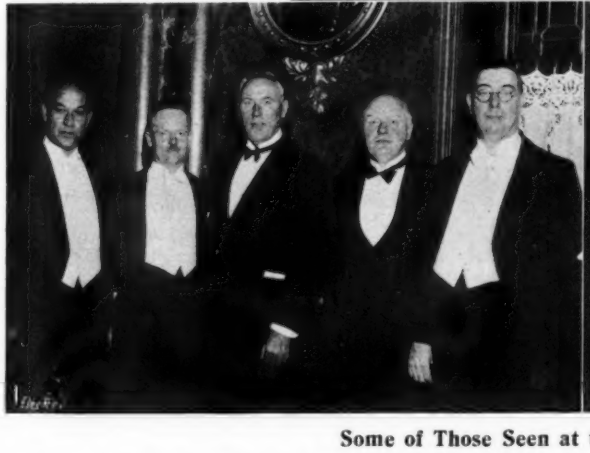
As the success of the grid scheme was dependent upon increased sales, every member should show his enthusiasm in securing consumers or influencing them to use more electrical appliances. The effect of the E.D.A. reorganisation would soon be felt; money was cheap and conditions were favourable to progress.

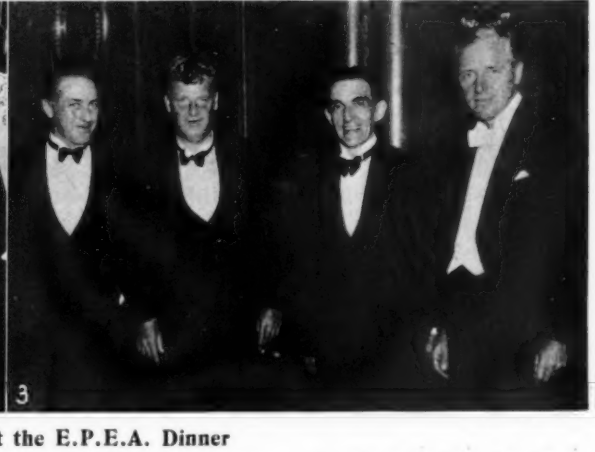
If the number of domestic consumers was increased by only 10 per cent., he estimated that with an average of five rooms per house at £8 each the value of the new installations would amount to £5 million and of meters £700,000; nearly six million (renewable) lamps would be required, and the revenue would be increased by £2 million. He believed that reasonable co-ordination of distribution would give a boost to development, avoid duplication of expenditure and increase employment. He had always found the Central Electricity Board anxious to help every undertaking.

The president (Mr. D. J. Duffy) referred to the machinery set up by the National Joint Board to find positions for displaced members, and stated that the Association had done well during the year in compensation cases. He pledged the members to do all in their power to bring about a cheap and abundant supply of electricity.

"The Electricity Supply Industry" was proposed by Mr. P. V. Hunter (president, I.E.E.), who pointed out that the present rate of increase in electricity consumed was better than some supposed, as it followed a sharp upward inflexion in 1929. The electrical industry had shown that it was the one industry capable of looking after itself and he hoped that nothing would be done in the way of further legislation to retard the good work. Mr. F. W. Purse, responding, deprecated the introduction of amateurs from outside the industry to control distribution; members of the E.P.E.A. were fully competent to do this. He urged them to join the I.E.E. and hoped that as many as possible would aim at full membership.

Mr. R. H. Toynbee (senior vice-president), on behalf of the members, presented Mr. H. J. Taylor (immediate past-president) with a radio set and Mrs. Taylor with a silver toilet set. After Mr. Taylor's reply, the chairman thanked the hon. secretary, Mr. F. H. Smethurst, for his work in organising the dinner. This is the third year in which Mr. Smethurst has performed this voluntary duty with conspicuous success—a success that was maintained throughout the reunion and dance that followed. The number present was close on 500, which is in itself tribute enough to the enjoyable character of this annual function. This reunion is the most notable meeting in the year of the technical staffs of our supply undertakings, and also of those who once did yeoman service for the E.P.E.A., but who have now achieved managerial responsibility without losing touch with its aims and ideals. We were especially pleased to notice so large a proportion of past-presidents of the Association in the gathering; nine of these (who now modestly refer to themselves as "old wood") will be recognised in the groups that came within the range of our photographer's camera.





Some of Those Seen at the E.P.E.A. Dinner

1. Messrs. J. H. Parker, H. J. Taylor, W. J. Oswald, A. C. Stewart, and T. A. G. Margary. 2. Messrs. C. C. Cooper (junior vice-president), R. Toynbee (senior vice-president), D. J. Duffy (president), F. W. Purse, and R. P. Sloan. 3. Messrs. A. V. Sendall, A. E. Ricketts, A. W. Crompton, and A. L. Lunn

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Electricity in Willesden

WE have received a copy of a brochure issued by the Willesden Borough Council on the occasion of the granting of the charter of incorporation. This contains an interesting review of the many activities of the borough, including the growth and development of the electricity undertaking. The Council erected its own generating station in 1903, but it was transferred to the North Metropolitan Electric Supply Co. in the following year, and the Council has continued since that date to take a bulk supply from the company. The number of connections in 1913 was 3,573, and this total had increased by March 31st last to 29,000 with an output of over 50 million kWh. Mr. A. W. Blake, M.I.E.E., the borough electrical engineer, has been largely responsible for this development.

Marine Radio Equipment

THE full range of wireless equipment which Messrs. Gambrell Bros., Ltd., are supplying through their associated company, the Marine Electrical Equipment Co., Ltd., is of modern design, neat workmanship, and compact arrangement.

The "Type 400" main radio-telegraph equipment is of 0.5 kW-anode rating and meets large vessels' requirements in the 600- to 800-metre wave band, while it is compact enough for installation in small ships. Provision is made for both i.c.w. and c.w. transmission, and all main controls are mounted directly in front of the operator. The transmitter wavelength is changed instantaneously by the movement of a single switch, while a small change can be made separately when necessitated by heavy interference.

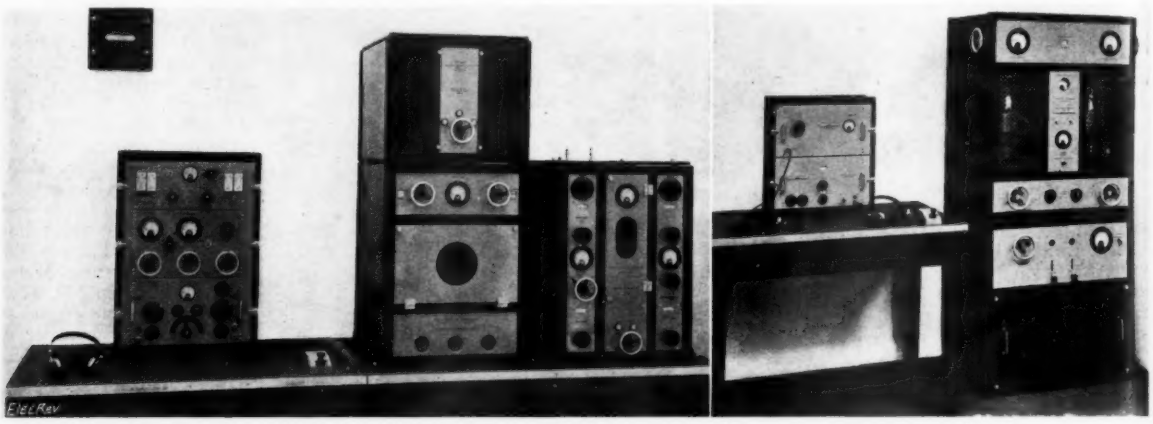
Power is derived from a motor-alternator set connected to the ship's mains, with an automatic starter. A.c. is employed in preference to d.c. to avoid using high-voltage commutators at sea. A single switch effects instantaneous change-over to emergency circuits.

The "Type 525" receiver has a wave range of 15 to 20,000 metres, with special provision for eliminating broadcast matter and other interference when receiving between 600 and 800 metres. Coil changing is not necessary for short or long waves.

Unit construction facilitates the withdrawal of sections like drawers, and the attachment of short- and long-wave transmitters to "Type 400," of similar size and appearance. Any two wavelengths between 16 and 40 metres can be pre-set, with single switch change-over to render retuning unnecessary. The short-wave transmitter is separate and has an independent drive, in preference to a self-oscillator which requires more power and might become obsolete due to inability to maintain the frequency within the fine limits which international regulations will make compulsory in future. The transmitter is mains driven, requiring no batteries whatever.

"Type 350" is short-wave equipment for use independently of the main medium-wave outfit. "Type 500" is similar to "Type 400," but can be used also for telephony with a range of over 400 miles. It is suitable for such vessels as whaler and trawler depôt ships, as well as coastal and land stations.

The "Type 130" low-power radio telephony set is suitable for fishing fleets. Transmitter, receiver, and control panel are mounted in one metal case and can be used by an unskilled operator. "Type 20" is a direction finder of the rotating loop pattern, with the receiver mounted on the lower tube above the scale and hand wheel.



Left: A radio-telegraph installation for passenger vessels; "Type 400" with long and short-wave attachments. Right: The "Type 500" medium-power telegraph-telephone equipment

In the lifeboat installation, "Type 200," the transmitter and receiver are enclosed in one watertight case. The quenched-spark transmitter obtains power from a small motor-alternator driven from batteries. The battery-operated receiver has two valves and a stand-by crystal detector.

The "Type 538" receiver is designed for the reception of Press messages and news from long-wave stations between 16,000 and 20,000 metres. A mobile telegraph-telephone set for motor boats, harbour craft, &c. ("Type 140"), can be used by entirely unskilled operators. The transmitter can be set to a fixed wavelength and remotely operated from a small switch panel, and the receiver is of special flat form for accommodation where space is limited. "Type MR.50" is a cabinet amplifier and turntable for reproducing gramophone records on board ship.

Electricity in the Federated Malay States

IN spite of trade depression new consumers with considerable installations continue to be added to the undertakings throughout the Federated Malay States. Mr. W. J. Williams, director of the Electrical Department of the F.M.S., in his annual report for 1932, states that, on the assumption that the connected load is 1.9 times the peak load, a sudden return of normal conditions would overload the existing plant.

The total revenue in 1932 amounted to £228,762, a reduction of 13.8 per cent. from the 1931 figure, and the total expenditure £142,658, a reduction of 4.27 per cent. After deducting payments to depreciation, renewals, pensions and other funds, there was a net surplus equivalent to 1.89 per cent. of the total capital which at December 31st stood at £1,473,817.

Statistical data are given regarding fifteen undertakings which operated ten power stations with an installed capacity of 22,331 kW, that generated 24.7 million kWh and had an aggregate peak load of 5,834 kW. Costs per kWh of generation amounted to 0.88d. (fuel and purchased energy 0.605d.), of distribution 0.41d., and of management 0.53d.

Considerably the largest undertaking was that serving Kuala Lumpur and district, with a maximum demand of 4,551 kW (5,320 in 1931), and a load factor of 46 per cent. The kWh generated was less than the 1931 figure by 14.7 per cent., being 12.9 million from the Bunsgar station and 5.4 million from the Ulu Langat stations (connected at the end of March). The thermal efficiency (on kWh generated) of Bunsgar was 12.13 per cent. (14.15 in 1931). The costs per kWh of generation were 0.64d. (fuel and purchased energy 0.44d.), distribution 0.37, and management 0.41d. The number of street lamps connected in Kuala was 2,351, with individual capacities varying from 60 to 1,000 W. In part of the area automatic time switches have been substituted for the hand-operated type.

Wiring installations for thirty-five cookers and sixteen water heaters were carried out by contractors to the Department's specification, and fifty-four cookers and thirty-six water heaters, by the Department staff.

The trade depression accounted for the return of a large amount of apparatus in 1932, including 791 table and ceiling fans, 152 cookers, and 105 water heaters. These were to some extent offset by the issue of 482 fans, 149 cookers, and 74 water heaters. Domestic apparatus on hire in 1932 included 1,261 fans, 327 cookers, and 313 water heaters. As some of the cookers are subject to somewhat severe treatment and all those in service are overhauled every six months, the expense is repaid by increased life and the rectification of incipient faults. Out of 8,460 meters in service there were 102 failures and 224 were damaged by lightning.

The kWh sold amounted to 13,294,000 (including 255,000 in nine villages), of which 1,068,000 kWh was used for public lighting, 2,787,000 kWh for private lighting, 8,396,000 kWh for industrial power, and 1,043,000 kWh for domestic power. Consumers connected totalled 6,886, including 167 for industrial power with 12,415 h.p. of motors. The decrease in the total kWh sold was 19.4 per cent.; industrial consumption declined by 24.7 per cent., but domestic power consumption increased by 3.9 per cent.

The total length of underground mains on the system is sixty-seven miles, and of overhead lines 244 miles. There was also 118,487 kW of generating plant in 139 installations that were subject to the Electricity Enactment, of which 49,000 kW was in mining and 46,000 kW in industrial works. These generated 144 million kWh, compared with 202 million in 1931.

Garden Floodlighting

Beautiful effects obtained at little cost

THAT much may be accomplished in the way of garden illumination at night by very simple methods is well demonstrated in the striking effects achieved by Mr. C. C. Paterson at his home—"Waldringfield," Oxhey, near Bushey—which we recently had the privilege of seeing both before and after nightfall.

The neat and unobtrusive installation consists of only three 750-W "Osram" lamps in rectangular projectors hinged on brackets set low down on corners of the building, but even this provides more light than that which would be strictly necessary in the average garden, where 500-W lamps should be quite adequate. Two 750-W spotlights in dormer windows which enhance the effect of the whole by throwing light on illumination. Almost overhanging this pool is an old hawthorn laden with berries; under the floodlight the scarlet tones are so well brought out that visitors have quite excusably believed it to be some rare foreign tree.

In the equipment of his home, Mr. Paterson, as an electrical engineer, has naturally gone in for all-electric methods. But it is Mrs. Paterson who is the enthusiastic consumer taking a practical interest in the many applications. Mrs. Paterson was good enough to demonstrate some of the score of uses to which a Hobart three-speed "Kitchenaid" can be put in the preparation of cakes, which were afterwards baked in the "Magnet" oven.

The latter has been fitted with a front of double glass, the

The excellent results obtained by Mr. C. C. Paterson in his floodlighted garden are indicated by the above views

to a small wood which fringes the garden may be regarded as somewhat special additions.

The main view of the garden for a distance of about 60 ft. over an area 60 ft. wide is obtained through the French window east of the lounge. This section is floodlighted from projectors one on each side of the doorway and invisible from the house; the use of duplicate lights in this way is to be recommended as harsh shadows are avoided.

Immediately in front of the windows is a large bank of heathers of various types which, together with appropriate seasonal plants, give a succession of bloom throughout the year. On the undulating lawns beyond the grass shows intensely green, and Mrs. Paterson told us that the delightful appearance of the pines, oaks and hawthorns silhouetted against the indigo sky was retained after all the leaves had fallen, and that the bare twigs then take on a vivid appearance that contrasts with their dull and lifeless look on a damp winter's day.

The outlook from the south window is on to a rocky pool, in which during the darker evenings various forms of wild life can be watched; these include frogs, stoats, and field mice which are apparently quite undisturbed by the brilliant inner one being of the "armour-plate" type. We were informed that the ability to watch the food during cooking has a distinctly utilitarian value as well as adding considerably to the interest of culinary operations. The ¼-h.p. extractor fan installed is a good addition even to an all-electric kitchen, and the refrigerator was referred to as something no household should be without.

The Junior Institution of Engineers

THE 1933-34 session of the Junior Institution of Engineers commences with an informal meeting this evening, October 6th. On the 13th Mr. E. Ambrose (chairman) will deal with the influence of harmonics in transformer circuits, while on the 27th Mr. H. E. Yerbury will outline the electrolytic theory of corrosion. On November 3rd Mr. W. F. C. Cooper will lecture on safety and efficiency in electrical installation work, and on the 17th Mr. H. A. Skinner will describe the development of the Brimsdown power station. On December 15th Mr. E. W. Carline Day is to lecture on the general principles governing cable network design and maintenance in large towns, and on the 22nd Mr. W. Harris will deal with recording sound for motion pictures.

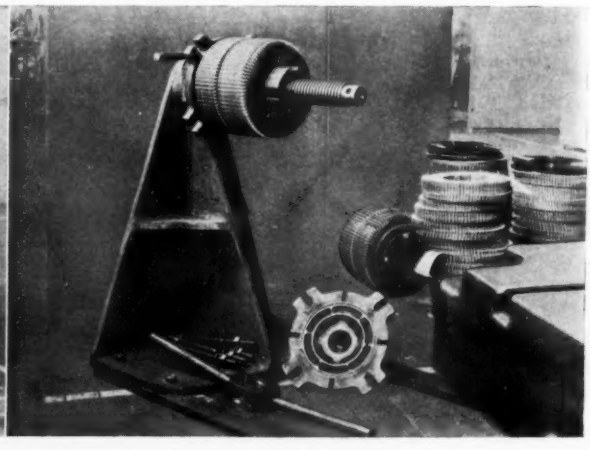
The Welded-steel Construction of Motors

The L.S.E. system for a.c. machines

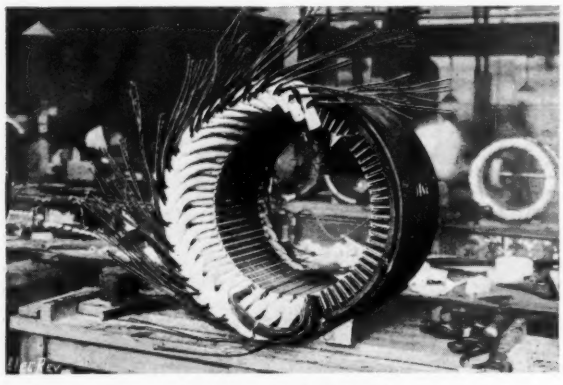
ONE of the most interesting technical developments that we saw during a recent visit to the Norwich works of Messrs. Laurence, Scott & Electromotors, Ltd., was the method employed in constructing a.c. motors on the L.S.E. welded-steel principle.

The stator plates are first built up under pressure on a special mandrel to ensure that the bore is true; it is held that the importance of getting this right at the outset justifies building from the inside outwards—a reversal of the usual order. After assembly the plates are welded together into a solid pack with eight or more steel strips. The pack is then wound, and as at this stage there is no outer frame the winder has exceptional freedom of movement. After winding an expanding mandrel is fitted in the stator bore and placed in trunnions with dummy end brackets, between which strong steel bars are fitted and welded to the stator pack on both sides.

The next step is the webbing of thick steel rings to the outside of the bars, on to which the feet are welded; the terminal box is welded where required on the steel rings. The spigots of the completed stator, still on the expanding mandrel, are turned in a lathe to ensure that the air gap shall be even all round.



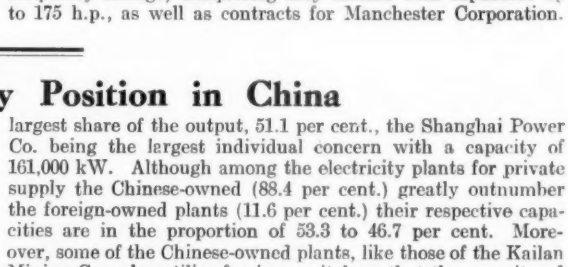
Left: Method of building up stator plates. Right: The rotor under construction



Stator on winding bench

The rotor is built in the same way. Four of the six wide keyways (according to size) are punched in the rotor plates and a corresponding number of steel keys are driven between the shaft and into the keyways and welded either to the shaft or, for motors of above 50 h.p., to the steel spider. This represents a departure from the usual practice of having one keyway and key between the rotor plates and the spider, and the method is claimed to ensure freedom from loose rotors as well as providing an exceptionally strong shaft.

The system is patented in fifteen countries, in two of which licences have already been taken out for manufacture. Among notable installations using motors of this construction are Barking, Salt River (Capetown), and Tees Bridge power stations, and the complete electrification with a.c. motors of the steel works of Messrs. Ashmore, Benson, Pease (due to frequency change) comprising fifty motors with capacities up to 175 h.p., as well as contracts for Manchester Corporation.



Expanding mandrel in stator bore

The Electricity Supply Position in China

ELECTRIC power has been employed in China for various purposes for about forty years, but comprehensive statistics relating thereto were lacking until recently Mr. Yun Chen, of the Chinese National Reconstruction Commission and concurrently chairman of the National Electricity Commission, made a general systematic survey of the power plants in China. The plants now operating in various parts of the Republic number 665, with a total capacity of 893,645 kW. Of these 519 have been erected for the purpose of supplying public consumers and have a capacity of 558,270 kW, while the remaining 146 have been built by factories and mines for their own use. The province of Kiangsu has the greatest number of plants—154, Chekiang being second and Kwangtung third.

Ninety-one per cent. of the stations erected for public supply are operated by Chinese private enterprise and 5 per cent. by the Government; the remaining 4 per cent. are concerns promoted by foreign investors. The first group produces 35 per cent. of the total output of power and the Government concerns 13.9 per cent., while the foreign enterprises produce the largest share of the output, 51.1 per cent., the Shanghai Power Co. being the largest individual concern with a capacity of 161,000 kW. Although among the electricity plants for private supply the Chinese-owned (88.4 per cent.) greatly outnumber the foreign-owned plants (11.6 per cent.) their respective capacities are in the proportion of 53.3 to 46.7 per cent. Moreover, some of the Chinese-owned plants, like those of the Kailan Mining Co., also utilise foreign capital, so that the capacity of the exclusively Chinese-owned concerns is actually less than 53.3 per cent.

The *Far Eastern Review* states that under the regulations governing electrical enterprises plants are classified in four grades—those having a capacity of above 10,000 kW form the first grade, those with a capacity of from 1,000 to 9,999 kW the second grade, from 100 to 999 kW the third grade, and from 1 to 99 kW the fourth grade. Of the 519 existing plants five are in the first grade, thirty-four in the second, 105 in the third, and 293 in the fourth, with the standing of the remainder unknown.

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Warming Buildings by Electricity

In his letter in your issue of September 29th "Crude Oil" states that he has "a large house with central heating and domestic hot-water service employing crude oil-fired apparatus." It would have been helpful if your correspondent had stated why he "thought of cutting crude oil out by using electricity," because it is well known that the use of electricity has advantages which are difficult to assess in terms of £ s. d.

Let "Crude Oil" understand that central-heating plant is more extravagant in the use of B.Th.U. than any other known system of warming, and, although the substitution of electricity as the heating agent may modify this extravagance, the plant itself is the dominant factor causing wastage of thermal units. Many people have had a calorifier fitted with automatic immersion heaters to provide hot water for domestic use during the summer months, and for this purpose the use of electricity is undoubtedly an economical proposition in those many areas able to offer it at low rates.

Our case is that electricity, applied in the correct manner for warming purposes, will prove economical in operation and yield the most efficient and hygienic results. Abundant evidence already exists in support of this. We do not seek to prove that, even when misused, electricity will yield satisfactory results. J. LESSER.

London, E.C.1, *September 29th.*

The First Essential

May I once again take up a small space in your correspondence column to comment on the need for selling more electricity, and propaganda schemes in connection with this. I want again to emphasise the point that there are a very large number of people in this country who know of the advantages of electricity and would be very glad to use it if it could be made available at a reasonable price. Many of these people cannot and are not likely to get electricity in the near future under the present conditions, and many others can only get it at a price which is not competitive with alternative means for purposes other than lighting.

However desirable propaganda, showrooms, demonstrations, &c., may be they cannot help these people. The first and most important matter is to find out why they have not got an electricity supply and to set about altering or modifying the present arrangements so as to make electricity universally available. Until we do this we are putting money and energy into methods which, though good, are not the really essential ones. H. WILSON, *Electrical Engineer*, U.D.C. Electricity Department.

Ashford, Kent, *Sept. 29th.*

Current Transformers

In the issue of the ELECTRICAL REVIEW dated September 1st, there appeared an article "Current Transformers," from which the following is an excerpt:—

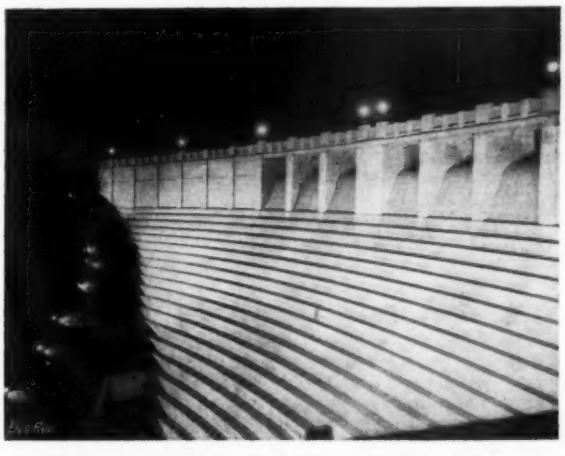
"The delta connection is essential for the differential protection of a star-star power transformer when the neutral point

Mr. John Drinkwater at the Brompton & Kensington showrooms (See note on page 464.)

of the secondary side is earthed, as in this case it is possible for a zero sequence component to appear in the currents on one side of the transformer without a corresponding component on the other side. An external earth fault will therefore set set up an unbalance in the secondary system of star connected current transformers, *due to the unbalanced zero sequence component in the main circuits.*" (The italics are mine.)

The statement referring to the zero sequence component requires explanation. Consider an earth fault either single or double line, on the secondary side of the power transformer: as the secondary neutral is earthed, there exists a path for the zero sequence component, but, as the primary neutral is free, there is no path for the zero sequence, compensating ampere turns on the primary, and hence they cannot flow. Consequently, there can be no zero sequence component, in the primary or secondary windings or lines connected thereto. Even if the primary neutral were earthed, there could still be no zero sequence component, unless the generator or system connected to the primary had its neutral earthed.

With the primary of the power transformer in delta, the zero sequence component will be present on the secondary



This picture shows the floodlighting of the Ryburn Dam, near Ripponden, Yorks, which has been constructed for the Wakefield Corporation waterworks. The photograph was sent us by the Yorkshire Electric Power Co.

side, because in that case, the closed delta provides a path for the primary zero sequence compensating ampere turns; there is, however, no zero sequence component in the lines connected to the delta. Even if the fault were on the primary lines, there would only be a zero sequence component if a path existed for its flow, *i.e.*, if the primary and generator neutrals were earthed. THOMAS ELLIS.

London, N.3, *October 2nd.*

The Heating of Lampholders

Referring to Mr. Hawkins's remarks upon this subject in your issue of September 15th, and those of Mr. Young in that of September 22nd, may I be permitted to make a few observations?

I think Mr. Hawkins must have been somewhat unfortunate in his tests of lampholders, because judging by certain tests which I have carried out from time to time, there does not appear to be any reason why he should have experienced any charring or distortion such as he describes providing he used lampholders produced in a good quality bakelite and with properly ventilated skirts. I have subjected good quality bakelite to a temperature of 150 deg. C. for several hours at a time, and the material did not show any signs of either charring or distortion; the screw threads on the mouldings fitted perfectly. Furthermore, I know of plenty of bakelite lampholders carrying 100-W lamps, which have run 8-10 hours per day from twelve months up to two years. These holders do not show any appreciable sign of failing in the manner described by your correspondent.

Mr. Young appears to be biased against bakelite due apparently to his having had the misfortune of installing some lampholders of this material which would not stand heat, and therefore gave trouble similar to that described by Mr. Hawkins. He would do well to keep in mind the fact that the fault is certainly not common to all bakelite holders. Further he refers to "the craze of calling everything shockproof causing a great deal of harm and making it harder to convince users of electricity that there is little or nothing to be afraid of," but if we are to cut out bakelite as he suggests, is there "little or nothing to be afraid of"?

We are left with the alternative of metal or porcelain. Of the unsuitability of the former for such situations as domestic bathrooms, sculleries, etc., there can be no doubt, as well as in the case of pendants in factories where in nine cases out of ten, there is a concrete floor. If one installs metal holders in

such positions, there is a definite danger, as the fatal accidents from time to time show all too clearly. Of course, one can earth metal lampholders and switch covers, but such a course often presents difficulties, and secondly, unless it is very well done its efficiency is open to very grave doubts.

I do not think that anyone will dispute the fact that as an insulating medium for switch covers and lampholders, porcelain is quite as good as bakelite, but the great difficulty is that it breaks so easily. Think for a moment of the number of broken switch covers one used to see when all-porcelain switches were popular. What could be a greater source of potential danger on an otherwise sound installation than a switch with a broken cover, especially when one considers that such breakages would not in a great many instances be made good immediately? The same remarks apply to Home Office pattern lampholders. It is fairly safe to assume that skirts would get broken, and if this was so and they were not replaced immediately, then one would be very little better off than if metal holders had been used.

I think, therefore, that to revert to metal and porcelain would definitely be a retrograde step, and I can only conclude by suggesting that anyone who is purchasing bakelite accessories should pay the utmost attention to the quality of the material, and not be tempted by fancy prices. J. Bolt.

Warrington, *September 28th.*

Overload Protection of Motors

In most cases electric motors can be adequately protected by well-designed thermal or magnetic overload releases, but for some duties, *e.g.*, where frequent starting is necessary, these types do not, in my experience, give the required protection. It would appear that the only reliable means of protecting such motors would be an overload relay operated by a thermostat embedded in the motor windings.

I should like to know if it is possible to design a reliable thermostat which could be fitted to existing motors, and if so, I should be glad to get into touch with any firm prepared to supply such devices. They would be required primarily for 50-h.p. and 75-h.p. protected-type a.c. motors, but might also be applied to smaller motors. They would presumably be constructed to interrupt the no-volt circuit of the existing circuit breaker, which would be retained to deal with short-circuits or failure of supply. H. J.

Lobitos, Peru, *September 10th.*

A Red-tape Worm

I quite agree with the remarks made by "Vermicide" in your issue of September 29th. As one who has had considerable experience over the last seven years in the design and erection of overhead lines, I should like to say that I have never yet had brought to my notice such a failure of the normal construction permitted by the Electricity Commissioners at road crossings as would have endangered any Post Office wires if they had happened to be beneath. The provision, therefore, of an auxiliary guard mat at Post Office crossings, with its almost inevitable hold-up of construction work, and unsightliness when erected, should be abolished.

Actually I have often found it necessary to resort to the more costly method of laying the lines underground at these points, rather than go to the expense and trouble of preparing an elaborate drawing for the Post Office, and perhaps waiting a considerable time for the approval to come to hand. As the cost of overhead line work, particularly in rural areas, must be kept to a minimum, then every effort should be made by those interested to get this useless and irritating regulation removed as soon as possible. C. Eric Stewart.

London, S.E.3, *October 2nd.*

New "Magnet" Appliances

Having devoted considerable study to requirements in the way of equipment for the restaurant trade and in particular the cafeteria and quick luncheon bars, the General Electric Co., Ltd., has recently introduced two electrical appliances. In a new electric waffle maker the base top is of cast iron finished plated, while the housing and supports are in black enamel. The two circular waffle plates, each 7½ in. in diameter, and loaded to 750 W, are of special cast aluminium, which, being porous, obviate the necessity of greasing before the batter is poured in. Each plate is independently heated and controlled by variable heat switches in place of the controls as generally fitted.

An electric pressure grill is designed for use in quick-luncheon establishments, and, it is claimed, will cook chops or steaks in two to three minutes, sausages in two minutes, and eggs in fifteen seconds. The grill is constructed of heavy cast and angle iron with plated finish, the base and legs being in black enamel. The heat is evenly distributed over the faces of the top and bottom plates, and is arranged for three-heat control. The top plate, which descends horizontally on to the food on the bottom plate, is hinged centrally and has a regulating handle at the side for adjusting it to suit the varying thicknesses of food under treatment. The grill is loaded to 3,000 W, and the overall dimensions are 20 in. long, 23¼ in. deep, and 13¼ in. high.

There is also a range of auxiliary cooking plates, comprising hotplates mounted on stands. These new appliances are available in various sizes, starting with a small 4½ in. hotplate loaded to 450 W, single heat, which can be used in a lighting circuit, and is listed complete with flex at 17s. 6d. The larger sizes have three-heat control, and can be fitted with oval-shaped hob surrounds which allow two or three pots to be kept boiling at the same time. The 8-in. "Magnet" plate will boil two pints of water from cold in 7½ minutes, and three pints in 9½ minutes. In all sizes the bases are neatly porcelain enamelled and are of a smooth "easy to keep clean" design.

The "Magnet" warming plate, "D.5667," presents a smarter appearance, as it has all parts finished in chromium plate, excepting the top surface, which is finished in bright black, by a special process, to ensure durability. These warming plates are supplied in four sizes, the smallest being 12 in. by 8 in., and the largest 24 in. by 12 in., and they have all been appreciably reduced in price.

The new "Magnet" electric water boiler and shaving pot is now made in chromium-plated copper, and is slightly altered in design. It is eminently suitable for bathroom use. The electrically heated towel rail and dryer, for wall or floor mounting, differs from last year's pattern, and is finished in chromium plate. The heater is loaded to 200 W. The hair-dryer, too, is now available on a stand.

Two new cast-iron fires have also been introduced; they are of 1 or 2 kW, respectively, and are available only in black stove enamel finish with coppered guard and heat-insulated drop-down handle. They are designed to meet an increasing market for a cheap and efficient radiator of neat and pleasing appearance. Curved panel elements are fitted; the 1-kW model has no switch, the element being connected directly to the main terminal. The 2-kW fire has a 10-A s.p. foot-press switch with coppered dolly, giving half heat when desired. Both these models are supplied complete with 6 ft. of three-core circular maroon cotton braided flexible.

There is also a new range of sheet metal fires of the "Inset" type in 1, 2 or 3 kW models, and for any standard voltage. These fires are of very modern design and are available in bright rustless metal, antique copper or antique silver, with the guard wire and facings in black bronze. The switches, wiring and elements are enclosed in a metal box at the back of the fire, and a special reflector is fitted. A fixing bracket and screws are supplied with each fire for fixing to marble or slate surrounds, while for tiled surrounds a special frame is supplied which can be slabbed into the tiles when the surround is made up. In addition to the standard finishes certain models are now provided with a chromium-plated finish.

New "Magnet" appliances: 1. The waffle maker. 2. A shaving pot. 3. Hairdryer and stand. 4. An auxiliary cooking plate. 5. The "Inset" fire

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

New "Creda" Fires

A number of new fires on very attractive modern lines have been introduced for the winter season by the SIMPLEX ELECTRIC CO., LTD., 159, Great Charles Street, Birmingham. There are ten new models, and brief specifications are given below.

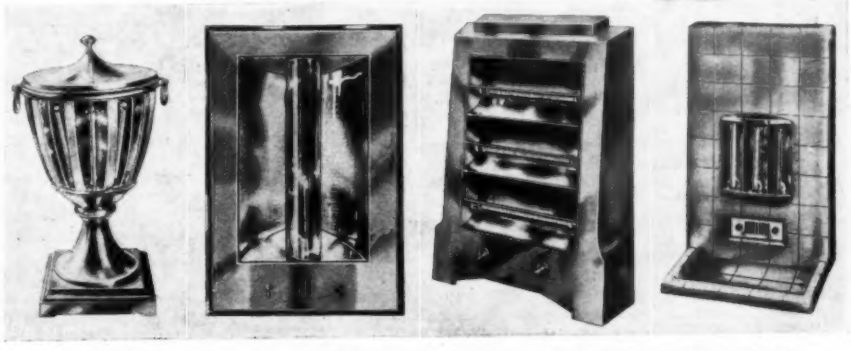
The "Adam Vase" is of unusual design, being in the form of an urn with "Creda Solex" bar elements fitted into the sides in front of chromium-plated reflectors. Weighing 52 lb. with measurements of 30 in. by 17½ in., the loading is 3.75 kW and the price 10 guineas.

The "Inigo" insert fire expresses modernity in every way, and is admirably suited to the plain clear-cut lines of modern architecture. The loading is 2.5 kW, and the price is 7 guineas. The measurements are 24½ in. high by 16½ in. wide by 4½ in. deep. The "Cotswold" is a new 3-kW imitation coal fire priced at £5 15s., with flickering flame, curling smoke and hearth glow effects. In this case the elements are recessed into the curved bars which prevent the "fuel" from falling out at the front.

The 2¼-kW "Kent" fire is of the insert type with three "Solar" element bars in front of polished reflectors, and it is priced at £6 10s. 6d. with surround. Four new insert fires have made their appearance (Nos. 948, 943, 947, and 946). Three are fitted with "Solar" bar elements and the fourth, No. 943, with "Sunbeam" elements. The prices are £2 15s., £1 10s. 6d., £2 17s. 6d., and £4 4s. respectively.

The "Orion," fitted with three horizontal bar elements, each with its own reflector, is loaded at 2¼ kW and is portable. The polished aluminium model, weighing 13¼ lb., costs £4 4s., while the cast-iron type, weighing 21 lb., costs £3 7s. 6d.

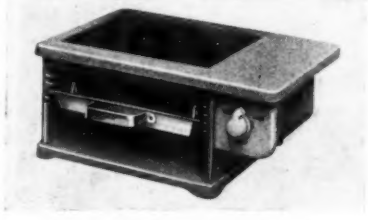
A new 2-kW slot meter fire has also been introduced. This has the slot-meter mechanism as a substantial base for the fire, giving a very pleasing appearance.



New "Creda" fires: The "Adam Vase," "Inigo," the "Orion" and an insert fire

A Breakfast Cooker

The accompanying illustration of the "Xcel" breakfast cooker recently introduced by SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 38-39, Upper Thames Street, E.C.4. Its overall dimensions are 16 in. by 10½ in. by 6¼ in., and the griller - boiler is loaded at 2 kW, with three-heat control. In mottled enamel finish, it is sold complete with a grill pan and grid and a heat deflector plate at the low price of £2 10s.



The "Xcel" breakfast cooker

A Bonding Box

A new addition to the range of "Blaco" conduit joints is a bonding box which can be used with all sizes of lead-covered cable from 1/.044 to 3/.029. By means of adjustable shutters the box is rendered watertight. There are no loose parts, and the lid is secured by a single screw, which is captive in the lid, a regular feature of "Blaco" products.

The finish is rust-proof cadmium plate and the boxes, which cost 10s. 6d. per dozen, are obtainable from Messrs. F. C. BLACKWELL & Co., LTD., Great Crosby, Liverpool.

The "Blaco" bonding box for l.c. cables

Radio Appliances

Two interesting accessories which have recently been marketed by PHILIPS LAMPS, LTD., 145, Charing Cross Road, W.C.2, are a loudspeaker (type 2159) and a pick-up (type 2980). The loudspeaker is of the permanent-magnet moving-coil unit type, complete with a step-down transformer. The unit is capable of excellent quality reproduction over a wide range of frequencies, and is supplied mounted on a small baffle, so that it can be incorporated in any radio unit with the minimum of trouble. The overall step-down ratio of the transformer is 70:1, which renders it suitable for pentode output circuits requiring a load resistance of between 10,000 and 20,000 ohms. It has a centre tapped primary. The speaker can be also used in conjunction with low impedance triodes and push-pull circuits. In sets which incorporate "q.p.p." and "class B" output stages the unit is supplied with a special transformer capable of giving plate-to-plate impedances of 10, 15, 20 and 30,000 ohms. The price is 35s.

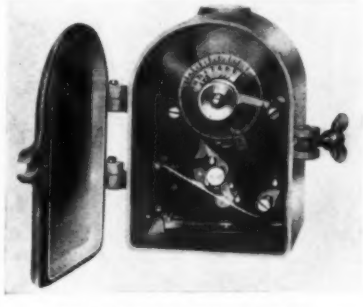
The pick-up is very light, being constructed throughout of "Philite" and finished to resemble ebony. The built-in volume control provides smooth adjustment, whilst an ingenious magnetic chuck keeps the needle firmly in position, but also allows it to follow the grooves, thus giving excellent reproduction with a minimum of wear. It is supplied complete with a tone arm, screws and a template ready for fixing, and also instructions for use, at 30s.

The "Invicta" Time Switch

The important feature of the new "Invicta" time-switch, a product of MESSRS. A. VANDAM & Co. (1933), LTD., Caxton House, Westminster, S.W.1, is that the contact fingers change their current-conveying contact points immediately before breaking, and, at the same time, their pressure together is increased, resulting in a high-speed break and avoiding carbonised contacts.

The four-point high-pressure contacts are double-locking, of precious metal, and, it is claimed, are unaffected by vibration. The time-switch is of the eighteen-day type, rated at 10 A a.c. and d.c.

In addition, double-circuit switches and a range of mercury switches have also been introduced by the company.



The "Invicta" time switch

An Unusual Toaster

In an appliance called the "New Idea" hot plate and toaster, MESSRS. JOHN SHAW & SONS, WOLVERHAMPTON, LTD., have combined a tray with the toaster so that it becomes a combination of a tray, toaster and warming grid. Two pieces of toast may be done at the same time, and the tray will be found of use for the reception of the finished toast, and for retrieving crumbs. The finish is nickel plate and the price is 21s.

The "New Idea" toaster

Moulded Accessories

We illustrate on the next page products recently introduced by MESSRS. MOULDED ACCESSORIES, LTD., 153, Great Hampton Row, Birmingham, 19. All are of bakelite, and the lampholders cost 6s. a dozen (with the H.O. skirt 50 per cent. extra), while the ceiling roses with moulded blocks cost 9s. a dozen.

D

The base of the ceiling rose measures 3¼ in. in diameter, and suitably drilled bakelite bosses are webbed to its side. Four

New moulded accessories

knockouts are provided, and the two contacts are separated by a ridge ¼ in. high. The lampholder contacts are also separated from each other by a ridge ⅛ in. high, and the liner is reinforced with brass. The spring plungers and terminals are in one piece, and the skirt is ventilated in three places.

A Quick Griller

A new quick griller and plate warmer sold by the DOWSING RADIANT HEAT CO., LTD., Bollo Lane, Acton, W.3, has recently made its appearance. It is claimed that it attains a grilling temperature in 3-4 minutes, and will grill a steak in ¼ hr.

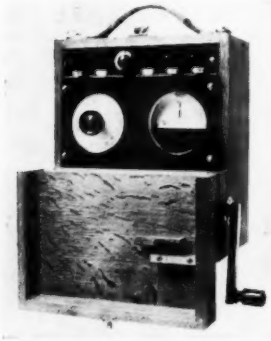
The equipment supplied includes a drip tray, bakelite door knobs and feet, a 2 in. mesh grid the height of which is adjustable, and a three-heat switch. Four sizes are available loaded at 1½, 2, 3 and 4 kW, and priced at £11 17s. 6d., £14 10s. £19 17s. 6d., and £24 17s. 6d., respectively. The two largest models have the grill in two separate sections, each with its own grid, drip tin and three-heat control switch. The grill chamber is double cased and lagged with ½ in. thickness of heat insulating material, and models can be supplied for use on voltages of 100-250 V, a.c. or d.c. supply.

The makers suggest that this type of quick griller will be of special use in clubs, restaurants, hotels, road houses, dining cars, etc., or other establishments where there is a rush demand.

Earth-plate Resistance Measurement

A potentiometer method in conjunction with a zero instrument has been adopted in a new earth-plate measuring instrument introduced by the ANGLO-SWISS ELECTRICAL CO., LTD., 15, Victoria Street, S.W.1.

An a.c. of from 30 to 50 cycles is provided by an integral generator, which is turned at about 2 rev. per sec., and a compensating resistance is adjusted until the galvanometer pointer comes to rest. The resistance in ohms of the earth connection can be read directly from the scale in one measurement without calculation. Measurements are independent within wide limits of generator speed, and reliability is claimed with a spike contact resistance as high as 10,000 ohms. The instrument is designed to be uninfluenced by stray earth currents.

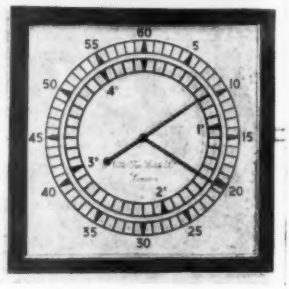


Equipment for measuring earth-plate resistance

Current from one terminal of the generator travels to the earth-plate through the primary of a 1/1 transformer, with a secondary burden formed by a compensating resistance, the adjustable contact of which is connected to a synchronous rectifier. The other pole of the rectifier is connected to a metal earthing spike, and potential balance is indicated on a moving-coil galvanometer connected across the poles. The second terminal of the generator is earthed through another spike. The instrument is manufactured by Messrs. Trüb, Täuber & Co., Zurich.

A Cost-time Meter

As its name implies, the "Cost-I-Meter," made by VENNER TIME SWITCHES, LTD., Kingston By-Pass Road, New Malden, Surrey, has been designed for use in the electrical showroom or demonstration kitchen to show the time taken by any electrical process and the cost of the current consumed during this period.



The "Cost-I-Meter"

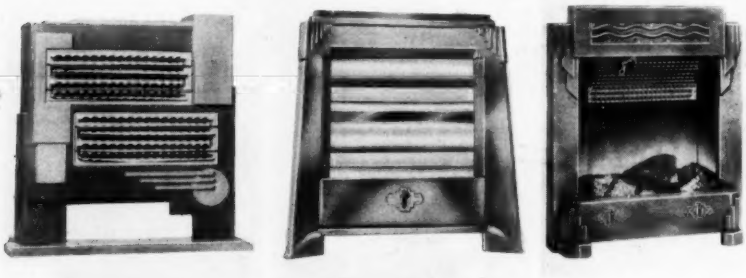
Outwardly, the apparatus consists of two independent hands rotating over a dial on which are two calibrated circles, the outer one being red and calibrated in minutes and the inner one showing pence in black. The longer hand, operating on the outer scale, is driven by a synchronous motor clock and makes one revolution in 60 minutes. The shorter hand, operating on the inner scale is driven by a watt-hour meter (20 A capacity) and is geared to revolve at a speed relative to the load and price per unit. Usually, this gearing is arranged to give one revolution for four kWh, which, at 1d. per kWh, would correspond to a calibration of 4d. on the inner scale.

Both hands can be reset externally to zero after each operation; the figures on the dial are large and clearly visible at a fair distance, and the whole unit is mounted in a polished oak case with glass front. The approximate overall dimensions are 31 in. by 31 in., and the diameter of the outer dial is 20 in. The price is £20.

Belling Fires

Modernity is the main impression we have of the new Belling fires which have been introduced for the first time this season. Two unusual designs are the "Cubic" (£2) and the "Multi-Ray" (£2 5s.). Both are loaded at 2 kW. As its name implies, the "Cubic" has the appearance of being made of a number of cubes built together in such a manner as to form a fire which conforms to the latest ideas in modern architecture. It is constructed on two planes and finished in two shades, the background being darker than the rest.

The "Multi-Ray," on the other hand, is a reflector fire in which the rod elements are focused in chromium-plated parabolic wells in such a manner as to radiate the heat rays outwards but in a slightly upward direction. Another new model, the "Duchess," is also on modern lines, but may be termed "dignified." The bars are horizontal and are situated above the imitation coal. The "Empress" is another fire of dignified appearance. The element bars are placed above the imitation coal under a substantial hood, some facing downwards at an angle of about 45 deg. from horizontal, and others directing their heat rays in a horizontal plane. The loading and price of this model are 3 kW and £7 15s., and those of the "Duchess" 2 kW and £2 15s.



Three new Belling fires: The "Cubic," "Multi-Ray," and "Empress"

The only other additions this year are two cheaper models, the "Beacon" and the "Pillar." The design of both is plain but attractive, the aim being to provide a moderate-priced fire of good quality with pleasing modern lines. No screw heads are visible, and as in all other Belling fires, asbestos pads are fitted between the multi-parabola fire-bars and the casting to keep the framework cool. The prices are as follows: "Pillar"—1 kW, 23s.; 2 kW, 35s.; 3 kW, 48s. "Beacon"—1 kW, 17s.; 2 kW, 25s.; 3 kW, 34s., finished in vitreous enamel.

All these models are made by MESSRS. BELLING & CO. at Bridge Works, Southbury Road, Enfield.

The "Supreme" Fire

A recent introduction by MESSRS. L. G. HAWKINS & CO., LTD., 30, Drury Lane, Kingsway, W.C.2, is a 25s. fire called the "Supreme." The case is claimed to be unbreakable as it is of pressed steel, and, so far as possible, dust-collecting crevices have been avoided. The measurements are 13½ in. high by 11½ in. wide, and the loading 2 kW. Chromium and stainless steel finishes are available at 32s. 6d. and 50s. respectively, the standard price of 25s. including vitreous enamel finish in pink, green, blue, brown, yellow or grey.

The 2-kW "Supreme" fire

The United States Foreign Electrical Trade

THE annual statement of the foreign trade of the United States has recently been published at Washington. From it have been taken the following figures showing the value of the exports of the leading classes of electrical machinery and apparatus in that year, together with the more noteworthy countries of destination. The total value of electrical machinery and apparatus exported from the United States fell from $85,373,000 in 1931 to $43,039,000 in 1932.

Exports to the United Kingdom were $2,753,000 in value last year, as against $8,870,000 in 1931; to Canada $7,369,000, against $18,335,000; to India $1,366,000, against $1,575,000; to Australia $904,000, against $950,000; to New Zealand $533,000, against $1,145,000; and to South Africa $1,813,000, against $2,544,000. The foregoing figures do not include cable and wire, which are classified separately by the American Department of Commerce.

	1932. $(000).	Inc. or Dec. $(000).
Generators, direct current under 500 kW—		
Total	59	− 229
To Canada	13	− 62
„ Mexico	8	− 12
500 kW and over—		
Total	15	− 172
Alternating current under 2,000 kVA—		
Total	160	+ 23
2,000 kVA and over—		
Total	690	− 680
To Soviet Russia	330	− 970
„ Spain	310	+ 310
Steam turbine generator sets—		
Total	109	− 915
To Mexico	47	+ 4
„ Hong Kong	47	+ 47
Accessories and parts for generators—		
Total	560	− 560
Arc welding sets—		
Total	275	− 265
To France	53	+ 26
„ United Kingdom	39	− 49
„ Canada	35	− 28
„ Mexico	26	+ 14
„ Hong Kong	32	+ 31
Self-contained lighting outfits—		
Total	115	− 225
To Soviet Russia	28	+ 25
„ Canada	18	− 28
Batteries—		
6 and 12 v storage batteries —*		
Total	320	− 650
To Norway	11	− 18
„ Panama	18	− 2
„ Cuba	27	− 15
„ Argentina	128	− 69
„ Brazil	34	− 34
„ Colombia	25	—
„ Venezuela	24	− 5
„ India	102	− 58
„ China	23	− 3
„ Dutch E. Indies	47	− 23
„ Philippines	38	− 15
„ South Africa	58	− 98
Other storage batteries—		
Total	250	− 460
To Canada	41	− 41
„ Mexico	61	− 12
„ India	40	+ 21
„ South Africa	25	39
No. 6 dry-cell batteries—		
Total	180	− 270
Flash-light batteries—		
Total	1,870	− 730
To Argentina	84	− 96
„ Colombia	76	+ 9
„ India	310	− 115
„ Malaya	145	− 75
„ China	360	+ 20
„ Dutch East Indies	280	+ 120
„ Hong Kong	180	− 20
„ Philippines	90	− 3
Radio B. and C. batteries (dry)—		
Total	180	− 145
To Argentina	70	− 40
„ China	20	+ 8
„ New Zealand	10	− 28
„ South Africa	12	− 14
Other dry and wet cell primary batteries—		
Total	87	− 23
Power transformers, 500 kVA and over—		
Total	620	− 190
To Soviet Russia	350	− 180
„ Spain	140	+ 70
„ India	85	+ 71
Distribution transformers, less than 500 kVA—		
Total	190	− 380
To Mexico	23	− 102
„ Colombia	23	− 7
„ Venezuela	29	− 11
„ Philippines	29	− 16
Instrument transformers—		
Total	84	− 76
To Brazil	16	− 12
„ Chile	23	+ 18
Other transformers—		
Total	220	− 180
To Canada	65	− 65
„ Mexico	26	− 14
„ Brazil	18	− 3
Double-current and motor-generators, convertors, &c.—		
Total	260	− 890
To Soviet Russia	30	− 110
„ Canada	50	− 240
„ Japan	22	− 42
„ Philippines	22	+ 13
Switchboard panels, except telephone—		
Total	320	− 1,390
To Spain	60	+ 59
„ Panama	56	+ 44
„ Brazil	54	+ 40
„ India	25	+ 14
Power switches and circuit breakers over 10 A—		
Total	500	− 790
To France	23	+ 11
„ Spain	125	+ 107
„ Canada	150	− 90
„ Mexico	21	− 59
„ Brazil	23	− 13
„ South Africa	20	− 20
Fuses—		
Total	80	− 110
To Canada	22	− 34
Watt-hour and other measuring meters—		
Total	230	− 340
To Argentina	35	+ 27
„ China	34	− 19
„ Philippines	56	+ 6
Indicating instruments—		
Total	260	− 270
To Italy	28	− 16
„ United Kingdom	30	− 18
„ Canada	66	− 74
„ Japan	22	− 18
Recording instruments—		
Total	260	− 40
To France	67	+ 37
„ Soviet Russia	57	+ 1
„ Canada	47	+ 4
Other testing apparatus—		
Total	540	− 100
To Canada	211	− 49
„ France	40	+ 13
„ Italy	39	+ 10
Lightning arrestors, choke coils, &c.—		
Total	335	− 275
To France	72	+ 23
„ Spain	40	− 25
„ Canada	24	− 66
„ India	44	+ 22
„ Japan	13	− 67
„ South Africa	14	− 19
Motors, ¼ h.p., and under—		
Total	490	− 1,000
To France	58	− 82
„ United Kingdom	65	− 185
„ Argentina	30	− 50
„ Brazil	34	− 15
Motors, over ¼ and under 1 h.p.—		
Total	145	− 190
To Canada	39	− 61
„ Argentina	24	+ 10
Stationary motors, 1–200 h.p.—		
Total	500	− 990
To Canada	66	− 184
„ Mexico	76	− 44
„ India	43	+ 20
Stationary motors over 200 h.p.—		
Total	65	− 580
To Brazil	36	+ 36
Railway motors—		
Total	48	− 132
To Spain	18	− 37
Electric locos., railway—		
Total	790	+ 620
To Soviet Russia	790	+ 790
Elec. locos., mining and industrial—		
Total	135	− 305
To Canada	34	− 26
„ South Africa	28	− 8
„ Mozambique	34	− 66
Electric trucks—		
Total	25	− 195
To Soviet Russia	11	− 109
Starting and controlling equipment for industrial motors—		
Total	480	− 780
To Soviet Russia	78	− 142
„ United Kingdom	29	− 61
„ Canada	185	− 215
„ Mexico	23	− 47
Ditto for railway and vehicle motors—		
Total	70	− 125
To Spain	21	− 60
Portable electric tools—		
Total	320	− 470
To France	35	− 5
„ United Kingdom	90	− 220
„ Canada	50	− 40
Accessories and parts for motors—		
Total	770	− 990
Household refrigerators—		
Total	3,360	− 3,500
To Belgium	157	− 408
„ France	216	− 42
„ United Kingdom	333	− 373
„ Canada	402	− 1,178
„ Brazil	180	− 60
„ South Africa	486	− 74
Commercial refrigerators—		
Total	1,370	− 400
To France	170	− 10
„ United Kingdom	169	− 82
„ Canada	220	− 250
Electric fans—		
Total	223	− 212
To Canada	61	− 39
„ Hong Kong	30	+ 17
Incandescent lamps for automobiles, flashlights, &c.—		
Total	120	− 95
Other metal filament lamps—		
Total	413	− 188
To Panama	41	− 24
„ Argentina	48	− 8
„ Chile	61	− 27
Other electric lamps—		
Total	44	− 46
Household washing machines—		
Total	254	− 616
To France	37	+ 11
„ Canada	99	− 236
Domestic vacuum cleaners—		
Total	377	− 803
To United Kingdom	2	− 708
„ France	56	+ 41
„ Holland	46	− 16
„ Canada	211	− 99
Flat-irons—		
Total	87	− 90
To Argentina	38	+ 7
Cooking ranges—		
Total	140	− 270
To Panama	21	− 52
„ Argentina	13	− 71
„ South Africa	73	+ 4
Electric furnaces, &c.—		
Total	220	− 680
To Soviet Russia	42	− 323
„ Canada	40	− 130
„ Japan	17	− 58
X-ray apparatus, &c.—		
Total	640	− 480
To Canada	240	− 200
„ Argentina	34	− 3
„ United Kingdom	65	+ 4
Radio apparatus.		
Transmitting sets, tubes and parts—		
Total	660	− 140
To Italy	90	+ 35
„ Canada	85	+ 20
„ Mexico	43	− 104
„ Bolivia	42	+ 42
„ China	49	− 2
Receiving valves—		
Total	2,010	+ 60
To Belgium	95	+ 48
„ France	180	+ 60
„ Italy	240	+ 30
„ United Kingdom	93	− 17
„ Argentina	285	− 35
„ Australia	460	+ 165
„ New Zealand	91	− 14
Receiving sets—		
Total	7,320	− 7,040
To Belgium	620	+ 190
„ France	520	− 240
„ Italy	98	− 692
„ Spain	820	+ 50
„ Switzerland	580	− 420
„ United Kingdom	370	− 1,550
„ Canada	110	− 1,450
„ Mexico	390	− 230
„ Argentina	380	− 1,330
„ Brazil	420	+ 30
„ China	240	+ 140
„ New Zealand	290	− 320
„ South Africa	450	− 170
Receiving set components—		
Total	2,520	− 1,370
To Canada	770	− 1,180
„ Argentina	575	+ 305
Loud speakers—		
Total	455	− 605
To Belgium	65	− 15
„ Argentina	165	− 105
Other receiving set accessories—		
Total	340	− 235
Telegraph apparatus—		
Total	160	− 150
To Germany	29	+ 7
Telephone instruments—		
Total	80	− 240
To Canada	16	− 99
Telephone switchboards—		
Total	80	− 10
Other telephone equipment—		
Total	670	− 800
To Canada	300	− 540
Starting, lighting and ignition equipment (except spark plugs)—		
Total	617	− 52
Insulating material—		
Total	246	− 314
To Canada	59	− 55
Metal conduit and switchboxes—		
Total	307	− 273
To Canada	71	− 66
Lighting switches, sockets, &c.—		
Total	690	− 680
To United Kingdom	129	− 141
„ Canada	192	− 253
Insulated iron or steel wire and cable—		
Total	27	− 81
Rubber-covered copper wire—		
Total	424	− 24
Telephone cable—		
Total	45	− 91
Other insulated copper wire—		
Total	390	− 1,320
To United Kingdom	65	− 235

* 6 v only in 1931.

Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments, Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

The Benevolent Penny Fund

We are informed that the first outside response to the appeal recently announced (ELECTRICAL REVIEW, September 1st) on behalf of the new Penny Fund of the Electrical Industries Benevolent Association was received on September 7th, 3s. 2d. being added to the resources. The inaugural collection, of course, took place at the luncheon at which Lord Meston, the president, was present. Over 140 collecting plates, of which we have already given an illustration, have been issued and are on active service. October 1st is the commencement of the Association's financial year, and annual subscriptions are already being received from prompt payers. Members and associate members are appealed to to pay promptly, and without being asked, so as to save the cost of collection. The new receipt card and holder are expected to assist subscribers to secure new helpers. Arrangements are well in hand for the ball, particulars of which have already been announced.

An Important Switchgear Contract

The order for switchgear recently placed by the Fulham Borough Council with the Metropolitan-Vickers Electrical Co., Ltd., is a large contract for indoor metal-clad 66,000-V gear designed to meet the specification prepared by the Council's consulting engineers, Messrs. Preece Cardew and Rider, and Mr. A. J. Fuller, who is also the borough electrical engineer. The order comprises three sections, each containing one alternator equipment, one reactor equipment and four feeder equipments. A fourth section is also included which will contain a transfer reactor equipment and neutral earthing gear.

The circuit-breakers are designed to be lifted vertically from their oil-immersed isolating contacts for inspection purposes, and a travelling crane is supplied in each section for taking the breakers to the unloading and inspection bay which will run across the ends of each switch house. The switchgear will be electrically operated and designed for duplicate bus-bars. The bus-bars and bus-bar connections will be paper insulated conductors of the condenser type having earthed metal armourings. Duplicate circuit-breakers are being supplied for both the alternator and feeder circuits and each breaker will be fitted with the "Metrovick" cross-jet explosion pot contacts and designed to interrupt a short-circuit of 1,500,000 kVA.

Each section of switchgear will control a 75,000-kVA turbo-alternator set. Two of the five sets ultimately required for this station are already in course of manufacture at the Metropolitan-Vickers works, Trafford Park. The control board will be situated in a room between the switch house and turbine room. It will be of the vertical-cubicle type surmounted by an automatic circuit-indicating diagram. An additional board of the desk type is to be provided for the control of the alternators. The contract price is approximately £297,000, and the bulk of the output from the station will be taken by the South-East England Area.

The E.D.A. Public Speaking Competition

The response to the first electrical public speaking competition held last year was so encouraging that the Council of the British Electrical Development Association has agreed to the recommendation of the Public Speaking Competition Committee that this competition should be made an annual event. Notices and booklets announcing the 1933/34 competition are now being issued through the E.D.A. Area Officers to provincial areas, and from 2, Savoy Hill, to the London and South-East England Area. This year the choice of subjects has been limited to three fields, the domestic, industrial, and social, all of which offer ample opportunity for interesting development according to the personal experience of the competitors. As before, eligibility for entering the competition is restricted to those employed by members of E.D.A., and, although under the reconstitution of the Association membership is now confined to supply undertakings, it is hoped that a still larger entry will be obtained this year and that at least one entry will be received from every supply undertaking.

New Irish Customs Duties

New customs duties on certain goods imported into the Irish Free State came into force on September 30th. These include belts and belting for the transmission of power, neon tubes and articles, including tubes for advertising, and lampshades, The new duties vary from 20 to 75 per cent. *ad valorem*.

A New Departure

The Brompton and Kensington Electricity Supply Co., Ltd., which was one of the pioneers in the development of the domestic load and also of electric cooking appliances, has again broken fresh ground. On the afternoon of September 29th, by arrangement with Messrs. W. H. Smith & Son, Mr. John Drinkwater gave a reading of a number of his unpublished poems in the consumers' lounge at 354, Earl's Court Road. Invitations were issued to residents in Kensington, and the lounge was crowded with a thoroughly appreciative audience. Mr. H. R. Beeton, chairman of the company, presided. It is hoped that similar gatherings will be held in the future.

The charming roof garden on the company's premises, which provides a display of simple but effective garden lighting, is open to the public daily during business hours, and also on Thursday evenings from 8 to 10 p.m.

The Morecambe and Heysham Illuminations

In the accompanying illustrations we show two features of the illuminations arranged in connection with the recent Autumn Carnival Week at Morecambe and Heysham. The picture on the left shows an old time sailing barque illuminated by spotlights attached to lighting standards and two G.E.C. floodlights. The other illustration is of the Carleton Café, which was awarded the Corporation 50-guinea challenge cup for the best illuminated premises carried out by private enterprise. All the public illuminations were carried out under the supervision of Mr. P. Clegg, the borough electrical engineer. These illuminations have proved so successful that they are being lent to Hull Corporation for its Civic Week which commences on October 11th.

Two features of the recent Morecambe illuminations

Local Radio Exhibitions

A radio and electrical exhibition was opened at the Whitecross Hall, Weston-super-Mare, on Friday, September 29th. Mr. Haskins, who is well known in West of England electrical circles, is the organiser of the exhibition. A display of floodlighting was also given.

After a successful ten days in the Colston Hall the Bristol Radio and Electrical Exhibition closed down on Saturday last. The attendance was well maintained, being in the neighbourhood of 22,000. There was no duplication of sets, as only one make of radio was shown by each exhibitor. The manufacturers made an excellent impression and seemed to be taking the opportunity of selling to the large market in the west that has been opened by the new West Regional station. During the week demonstrations of television, telephony and floodlighting were given.

The Leeds Electrical Club

The Leeds Electrical Club is to hold its annual dinner and dance, including a cabaret, at the Victory Hotel, Leeds, on November 29th. Tickets (10s. 6d. each) can be obtained from Mr. E. G. Sellers, hon. secretary, Welsbach House, Park Place, Leeds.

Increased German Duties on Electric Lamps

The recent lapse of the German patents for the tungsten drawn-wire filament has been anticipated by the German Government by the publication in the *Reichsanzeiger* of a decree which aims at the further protection of the national lamp industry from foreign competition in the home market. It is stated that the national industry needs a greater measure of protection as, while the imports increased from 7,300,000 lamps to 8,900,000 in the years 1930 to 1932, German lamp exports diminished in the same period from 82,800,000 to 41,000,000. Under the new law, which was brought into force on October 1st, the import duty under the general tariff.

which has hitherto amounted to 80 marks per 100 kg. in the case of lamps having an individual net weight of over 30 grammes, has been increased to 800 marks per 100 kg., and that on lamps having a net weight of 30 gr. or less has been raised to 1,200 marks. At the same time the import duty under the "super-tariff" has been advanced from 600 marks per 100 kg. to 1,600 marks. However, the old rate of 80 marks under the general tariff will continue in force for lamps of up to an annual quantity which corresponds to the average imports from individual countries during the years 1930-32, while for 1933 the quantity imported between the beginning of January and the end of September has to be deducted. The above measures are obviously aimed at rendering Japanese imports difficult, if not impossible, and for this purpose a higher duty has been fixed for the smaller lamps, of which the Japanese make a speciality. On the other hand, the maintenance of the rate of 80 marks for the average of the years mentioned is intended to exempt from the higher duties the imports which are cartel-bound under the Continental Glow Lamp Syndicate, of which the German lamp makers are members.

A Turner & Newall Consolidation

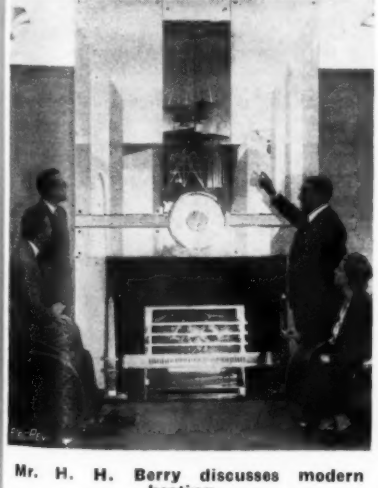
The directors of Messrs. Turner & Newall, Ltd., have announced that as from Friday last they have consolidated such of their subsidiary companies as deal exclusively with the manufacture and sale of asbestos cement and asbestos electrical insulations into one organisation which will be a branch of the company and will trade as "Turners Asbestos Cement Co., Branch of Turner & Newall, Ltd." The consolidated organisation will have its headquarters at Trafford Park, Manchester, and a chain of works and branch offices throughout the country. The directors state that this is a further step in the declared policy of the company of consolidating into one unit all interests of an analogous nature, for which purpose four subsidiary companies—Asbestos Cement Building Products, Ltd., Bell's Poilite & Everite Co., Ltd., Turners Asbestos Cement, Ltd., and British Fibrocement Works, Ltd., will go into liquidation forthwith. The reorganisation has already been effected to a large extent, and as regards customers, is a change of name only, not affecting the head office or branch officials, whose services and experience will be retained in the same capacity as hitherto.

New Electricity Showrooms

The County of London Electric Supply Co., Ltd., has opened new showrooms at 143, High Road, Loughton.

Modern Electric Heating

The extension of their showrooms which Messrs. Berry's Electric, Ltd., have opened at 85 and 86, Newman Street, Oxford Street, W, embodies many novel features, and we think the methods used in displaying the apparatus, as well as the apparatus itself, are well worth the attention of all engineers who are interested in attracting the public interest. The new room is built of pressed-steel double walls, with a cavity depth of 6 in. This arrangement makes wiring and erection of the appliances a cheap and easy matter. The hall is of most modern appearance and is lighted by three alternative methods—"daylight," "sunshine," and "white." Eighteen models of fire are demonstrated, including the "Magi-panel," which takes up no more space and projects no farther than a picture on a wall.



Mr. H. H. Berry discusses modern heating

The dominating feature of the hall is the fireplace at one end, containing a large "Magicoal Plus" fire and rising eleven feet to the ceiling. The surround is of plate glass in shades of blue, and giving in the centre a perspective view of grid lines to convey the idea of the transformation of coal into electricity at the generating station and its reconversion on the hearth to complete the cycle.

Mr. H. H. Berry gave a short lecture on "Modern Heating" at the opening function, in which he traced the development of domestic heating from the discovery of "sea-coal" in Newcastle-on-Tyne in the twelfth century. He pointed out that the imitation coal fire was a "sham" only in the sense that decorative lighting effects were shams, and strongly recommended that the decorative effect of this kind of fire should be controlled from the door. His firm, he said, had supplied fires to forty-two States in America, in spite of a duty of 40 per cent. He went on to describe the 237 "one coal-fire" houses now being built on the Parkside Estate at Surbiton for a rent of 25s. 9d. per week. The electrical equipment includes a refrigerator, cooker, copper, a panel-fire in the hall, a "coal-fire" in the dining-room, a fire in each bedroom, towel-airer, wireless points in the main rooms, and a thermostatically controlled water heater, operated in conjunction with the one (real) coal-fire. All this equipment is included in the rent. Energy is supplied on a tariff of £4 per annum, plus ½d. per kWh in the summer and ¾d. in the winter.

A Cosmos Lamp Calendar

We have received from the Metropolitan-Vickers Electrical Co., Ltd., one of its "Cosmos" lamp calendars for twelve months from October, 1933, to September, 1934. This is of the wall type with daily slips and quotations. As our illustration shows, the picture is entitled "Thoroughbreds," and is reproduced from a pastel of a charming blonde holding a borzoi.

The "Cosmos" lamp calendar

An E.I.B.A. Request

Mr. Justus Eck, honorary secretary of the Electrical Industries Benevolent Association, 9, Southampton Street, London, W.C.1, is anxious to get into touch with the editors of electrical house journals and to receive copies of these publications.

Recent Contracts

Messrs. C. A. Parsons & Co., Ltd., have received an order from the Australian Paper Manufacturers, Ltd., of Sydney, for a turbo-alternator of 3,000-kW capacity, complete with surface condensing plant. The set, which is of the "Uniplane" non-basement type, will generate current at 3,300 V and will work with steam at 400-lb. pressure superheated to 700 deg. F. Messrs. Parsons have also received orders for two complete geared turbo-generating sets for British paper mills. The turbines in both cases are arranged to pass out steam for heating purposes. One of the sets is of special interest for the reason that the turbine will drive both a 1,250-kW alternator and a 1,000-kW d.c. generator, and each machine will be ventilated on the closed-circuit system.

The large tarmacadam mixer of the British Quarrying Co., Ltd. (Clee Hill Quarries), at Bitterley, near Ludlow, which was recently destroyed by fire, is being replaced by an up-to-date all-electric plant for the production of tarred and asphaltic road materials. Messrs. Stothert & Pitt, Ltd., Bath, are carrying out the main machinery contract. Clarmac Engineering Co., Ltd., has secured the order for the latest type of electrically heated boilers, and English Electric Co., Ltd., is supplying additional power equipment to cope with the increased capacity. The whole plant will be driven, heated, and lighted by electricity from the Shropshire, Worcestershire and Staffordshire Power Co.'s mains. A temporary portable plant for the new product "Granophast" has also been erected, driven by Crompton Parkinson equipment.

The new showrooms which are being built for the Swindon Electricity Department will be heated by a thermal storage system, the contract for which has been placed with Messrs. Bastian & Allen, Ltd.

The Radio Market in the Philippines

A report on the market for radio apparatus in the Philippine Islands by H.M. Consul-General at Manila has been issued by the Department of Overseas Trade. This states that radio reception is fairly popular in the Philippines and over 10,000 receiving sets are in active use. Fully 80 per cent. of these are only equipped to receive the American broadcast band of 250/500 metres. The market is dominated by standard American sets, although a small footing has been established by Dutch apparatus. In recent years the annual importation of radio apparatus has approached £150,000 at par, the United States being the only important supplier. Practically speaking, there is no radio apparatus of United Kingdom manufacture in the country. The main demand is for complete sets, and there is little scope for the sale of valves and other components except as replacements. The American position in the market is protected by a duty on foreign goods, which has now been raised to 30 per cent. *ad valorem*. It is impossible to speak very hopefully of the prospects of introducing United

Kingdom radio apparatus into the Philippines. Probably the best chance lies in the short-wave field, and it is suggested that the local agents might be asked whether they would accept representation in special lines which do not conflict with their existing arrangements.

Trade Announcements

Messrs. Wilkins & Wright, Ltd., have removed their London offices to 11, Newman Street, Oxford Street, W. (Telephone: Museum 6616.)

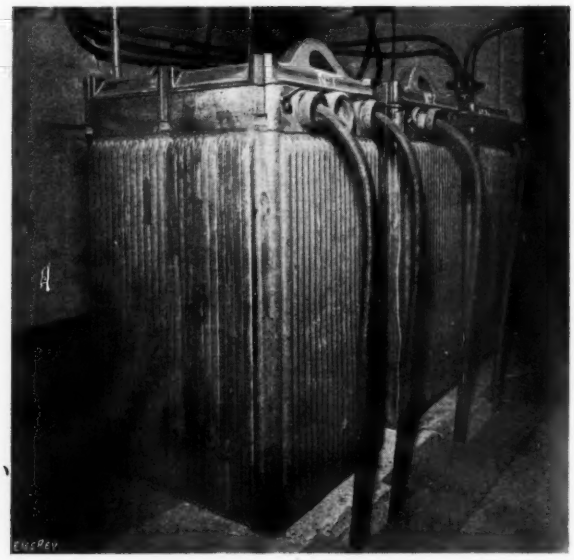
The Sun Electrical Co., Ltd., is removing its Newcastle branch to more commodious premises at Sunco House, Carliol Square, Newcastle-on-Tyne, 1. The telephone number and telegraphic address remain unchanged.

Avoiding Electrical Breakdowns

A practical little book has been published by Messrs. Evershed & Vignoles, Ltd., entitled "How to Avoid Electrical Breakdowns," which can be obtained free of cost from the company. It is primarily addressed to the man without technical knowledge who should be able with its aid to carry out routine insulation testing on motors, generators, domestic apparatus and house wiring, and also on circuits in which capacity is present. With the aid of a log book, which will also be sent free of charge to any user of "Megger" insulation testers, the operator can keep suitable records.

The Brush Transformer Book

The new catalogue issued by the Brush Electrical Engineering Co., Ltd., represents a departure from conventional methods. In the thirty-six pages there are fifty-nine realistic photographs illustrating the wide range of transformers built and of the accessory equipment available. Relative scale is observed where transformers with different ratings are shown on the same page. One of the photographs (reproduced herewith) is of three 36-kW single-phase 2,000/200-V transformers which have been in continuous service since 1896-8 in Market St. sub-station, Leicester; these are said to be the oldest British transformers still in active use. Included in the text are



Three Brush transformers at Leicester which have been in use since 1896-8

technical descriptions of design and manufacture of transformers and a summary of the requirements of B.S.S. 171.

For Sale

The Basingstoke Electricity Department has for sale d.c. meters.

The Preston Electricity Department invites offers for the purchase and removal of drums of cable.

The Hoylake Urban District Council has for disposal Belliss engines, condensers, &c.

(See our classified advertisements.)

"Armaflex" Cable

The Power Flexible Tubing Co., Ltd., Derby Works, Finsbury Park, N.4, informs us that it has acquired the patents, machinery and goodwill from the Armoured Cable Co., Ltd., the manufacturers of "Armaflex" cable. This cable, for installation wiring has a flexible metallic covering which is actually wound round it during manufacture.

Prices of Materials

Messrs. F. Smith & Co. report October 4th: Copper (electrolytic) wire rods, £47 5s., £1 5s. increase. Ditto, ditto, b.c. wire, 7$\frac{9}{16}$d., $\frac{3}{16}$d. increase. Silicium bronze wire, 8$\frac{11}{16}$d., $\frac{3}{16}$d. increase.

Messrs. Edward Till & Co. report, October 4th: No change in the price of India-rubber, Para fine.

Messrs. James & Shakespeare report, October 4th: No change in the price of copper bars (best selected), sheet and rod. English pig lead, £13 10s., 5s. inc.

Italian Foreign Electrical Trade

The appended table shows the Italian imports and exports of electrical machinery and apparatus during the six months ended with June last as compared with the corresponding half of 1932. It will be seen that the imports have declined by £450,330, or over 32 per cent., while the exports show a fall of £594,755, or about 60 per cent.

	Imports. January—June.		Exports. January—June.	
	1932. Lire, Thousands.	1933. Lire, Thousands.	1932. Lire, Thousands.	1933. Lire,
Accumulators and parts	575	500	1,103	733
Lamp bulbs	725	813	—	14
Electrical measuring instruments	2,043	1,888	239	67
Radio apparatus	10,847	9,311	2,059	1,336
Telegraph and telephone apparatus	18,637	9,781	873	1,544
Misc. electrical apparatus	23,991	15,380	17,405	6,740
Elec. furnace and other carbons	5,148	3,106	165	161
Insulated cables	623	157	2,713	854
Electricity meters	1,841	1,423	287	291
Insulated wires	590	405	2,784	1,668
Generators and motors "without collectors"	4,618	3,849	3,003	805
Generators and motors "with collectors"	8,857	5,901	13,479	7,442
Glass and porcelain insulators	186	182	825	335
Arc lamps	28	14	—	8
Incandescent lamps	4,008	2,675	940	712
Static transformers	2,678	983	10,880	402
Insulating tubes	1	8	21	13
Total lire	83,396,000	56,376,000	57,376,000	22,891,000
Total at 60 lire to £	£1,389,930	£939,600	£956,265	£381,510

A Brighton Showroom Display

In connection with the additional 30,000-kW turbo-generator at present in course of erection at the Southwick power station, an exhibit of a model of the plant is at present on view in the windows of the Brighton Corporation Electricity Showrooms in Castle Square. This model is on the scale of one-sixteenth, and is the property of Messrs. C. A. Parsons & Co., Ltd., of Newcastle-on-Tyne, the makers. It has been on view at the Engineering and Shipbuilding Exhibition at Olympia.

The Wood Green Charter Celebrations

Siemens Electric Lamps & Supplies, Ltd., inform us that the lighting equipment and lamps used for the decorated tramcar illustrated in our last issue (page 436) were supplied by them. They state that the car was such a success that the neighbouring boroughs of Southgate and Finchley are using the same car during their own festivities.

The Gainsborough Film Studios

We are informed by Messrs. George Ellison, Ltd., that the switchgear illustrated on page 415 of our last issue is of their manufacture.

Catalogues and Lists

Stanley Electrical Co., Latimer Works, Teddington.—List G.8 of time switches and flashers, including some models which the company has recently introduced.

British Electric Domestic Appliances, Ltd., 3, Hanover Court, E.C.—Illustrated leaflets relating to the "Mary Ann" electric vacuum cleaner.

Walsall Electrical Co., Ltd., 61, Bridge Street, Walsall.—A new list of electrical measuring instruments, illustrated and priced.

C. A. Parsons & Co., Ltd., Heaton Works, Newcastle-on-Tyne.—Leaflet No. 36, entitled "Parsons Turbo-Alternators," and No. 37, "Parsons High-Voltage Alternators."

The Northern Steel & Hardware Co., Ltd., 1 and 3, Southgate, Deansgate, Manchester.—A wholesale radio catalogue for the 1933-34 season.

R. & A. G. Crossland, Price Street, Birmingham.—A catalogue of "Croslac" panel fittings and lanterns.

British Insulated Cables, Ltd., Prescot, Lancs.—A brochure (p. 275), illustrating B.I. service cut-outs.

"Typerlite" Co., 86, Cannon Street, E.C.4.—The 1933-34 catalogue of "Typerlite" lighting fittings.

Henderson's Electrical & Wireless Service, "Electric House," Queen's Road, Brighton.—An illustrated list of radio sets for the 1933-4 season.

Piggott Electrical Co., Ltd., Salisbury Square House, E.C.4.—A pamphlet relating to "Alpha" electric domestic appliances, including fires, irons, kettles, &c.

Hoffmann Manufacturing Co., Ltd., Chelmsford.—An abridged catalogue (S.C.11) of ball and roller bearings.

Drake & Gorham Wholesale, Ltd., 77, Long Acre, W.C.—Pamphlet No. 528 containing illustrated particulars of receiving sets, radiograms, &c. Also pamphlet 523 of modern electric lighting fittings.

British Thomson-Houston Co., Ltd., Crown House, Aldwych, W.C.—A folder giving details of the "Mazda" sun lamp.

Siemens Bros. & Co., Ltd., Woolwich, S.E.—Catalogue 150 dealing with paper-insulated cables and containing illustrations of the company's works. The publication also includes a number of tables. Pamphlet 471A describing a wireless direction finder for ships, and 475A giving illustrated particulars of a wireless auto-alarm with electrical selector for ships.

Electric Resistance Furnace Co., Ltd., 17, Victoria Street, W.C.—Pamphlets S.R.M., S.R., and S.R.C., relating to self-regulating induction furnaces, and F.1 dealing with forced-air circulation furnaces.

Elliott Bros. (London), Ltd., Century Works, Lewisham.—Catalogue 311, describing the Tollemache bin level indicator.

Newtons of Taunton, Ltd., 319, Regent Street, W.1.—Leaflets giving illustrated particulars of high-frequency tools made by Rotax, Ltd.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.—An illustrated folder of new decorative lighting fittings for the Christmas trade. An illustrated price list (F.6680) of lighting fittings.

Switchgear & Equipment, Ltd., Delavox Works, Banbury.—A leaflet drawing attention to the "SE" pull-down switch fuse.

Geo. Bray & Co., Ltd., Leeds.—Leaflet C.126, giving dimensions and loadings, boiling times, &c., of the Chromalox "RB" ring elements used in the standard Chromalox range plates.

Girlings, Ltd., Maldon, Essex.—Two illustrated folders (Lists 160 and 153), dealing with "Mosaic" electric fires, boiling rings and a grilling attachment.

Display Craft, Ltd., 68, York Road, Waterloo, S.E.1.—An illustrated folder describing an "all-in" display service for national advertisers, retailers and trade exhibitors.

Power Contracts (Batwin), Ltd., 138, Southwark Street, S.E.1.—A leaflet describing the KL capacitor type motor.

A.E.G. Electric Co., Ltd., 131, Victoria Street, S.W.—A leaflet drawing attention to the "Neron" lamp for electric signs and illumination schemes and a brochure describing and illustrating oilless circuit-breakers.

Davy Bros., Ltd., Park Iron Works, Sheffield.—Catalogue No. 63 of filter presses, dryers and mixers.

Bankruptcy Proceedings

J. S. Lowden (otherwise known as H. R. Bishop), wireless dealer, lately trading at 165, Piccadilly, W., as "The All British Valve Company."—The public examination of this debtor was held on September 26th before Mr. Registrar Mellor, at the London Bankruptcy Court, the accounts showing liabilities of £3,829, against assets of £36. The debtor stated that he started as a wireless dealer in September, 1932, and continued that business under management until the following December, when he sold the assets for £2,500. He remained responsible for the liabilities, which then amounted to £3,500, but had since been reduced to £2,000. He attributed his insolvency to the general slump in a stamp business which he also carried on; to a net loss of £1,738 on the wireless valve business; to liability under guarantees, and to excessive drawings. He further stated that in March, 1933, J. S. Lowden, Ltd., was formed with a capital of £200 and carried on business as retail stamp and wireless dealers. He acted as a director of the company at a salary of £6 a week until the date of these proceedings, and had since been employed by the company at the same salary. The examination was concluded.

J. H. Withycombe, 61, High Street, Barnstaple, Devonshire, electrical engineer and radio dealer.—The public examination herein was held on September 28th, at the Guildhall, Barnstaple, when the statement of affairs showed liabilities of £1,163 and assets of £483, leaving a deficiency of £680. Debtor attributed his position to over-buying and giving too much credit. He realised his position in March last but continued, hoping to go through the summer and secure a good winter trade. The examination was closed.

E. V. Day, radio dealer and radio engineer, 16, King Street South, Chesterfield.—Receiving order made September 21st on debtor's own petition.

Public examination, October 13th, at the County Police Court, Chesterfield.

A. Senior and **H. Senior** (A. Senior & Son), electrical contractors, Back North Terrace, Darlington.—First meeting October 6th, at 80, High Street, Stockton-on-Tees. Public examination, October 26th, at the Court House, Bridge Road, Stockton-on-Tees.

J. D. Lister (Frank Woolfenden & Lister), electrical and radio engineers, 56, Victoria Street, Littleborough (separate application).—Application for discharge to be heard on October 20th at the County Court Buildings, Rochdale.

F. W. Hodges, electrical engineer, 47, Cherry Orchard, Kidderminster.—Trustee, Mr. A. M. Fairbairn, 1, Priory Street, Dudley, Official Receiver, released September 20th.

R. F. Davis, electrical engineer, 21, Derringham Street, Hull.—Trustee, Mr. J. E. D. Stickney, 37, Scale Lane, Hull, Official Receiver, released September 20th.

E. L. Pratt, electrical engineer, 5, Nowell Mount, Harehills, Leeds.—Trustee, Mr. C. H. Baker, Standard Buildings, City Square, Leeds, released August 25th.

A. C. Gardner, wireless dealer, 7, Midland Road, Derby.—Last day for receiving proofs for dividend October 14th. Trustee, Mr. L. A. West, 22, Regent Street, Park Row, Nottingham, Official Receiver.

Private Arrangement

S. D. Rock, 88-90, Hessle Road, Hull, wireless dealer.—The creditors were called together recently at Hull, when a statement of affairs was submitted which showed ranking liabilities of £1,108 due to unsecured creditors. In addition, there were fully secured creditors for £1,833. After allowing £61 for preferential claims, the net assets were £1,067, leaving a deficiency of £41. The book debts included a number of hire-purchase transactions which had been financed by the debtor personally. The ranking liabilities included family creditors for over £500, chiefly in respect of cash advanced. It was decided that the meeting should be adjourned to enable the debtor to submit a guaranteed offer.

Company Liquidations

Low Tension Luminous Tubes, Ltd.—Winding up voluntarily. Liquidator, Mr. Harold J. de Courcy Moore, 4, London Wall, E.C.

Electric Lamp Factors, Ltd.—Winding-up voluntarily. Liquidator, Sir William H. Peat, 11, Ironmonger Lane, E.C.

Corlett Electrical Engineering Co., Ltd.—Meeting, November 1st, at 5, King Street West, Wigan, to receive an account of the winding-up by the liquidator, Mr. J. Houghton.

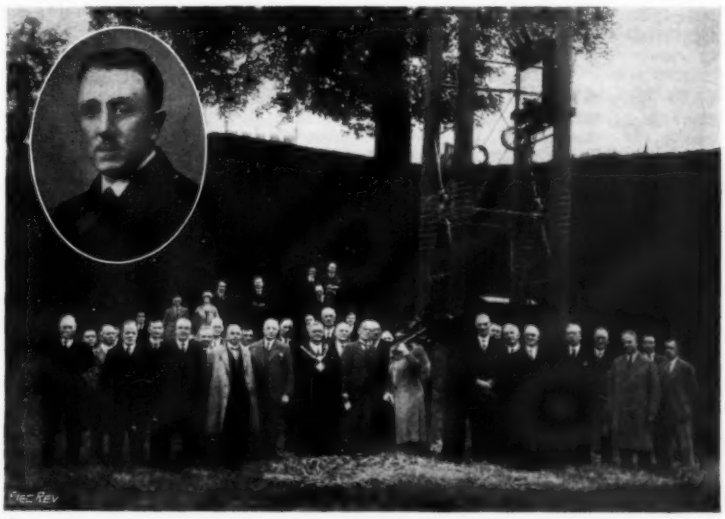
Keeping Young Pigs Warm

CHIPPING, an old-world village with narrow winding streets and cobbled side walks mentioned in the Domesday Book, celebrated on September 27th the introduction of its supply of electricity. Chipping has 700 inhabitants and is situated nine miles from Clitheroe. Villagers crowded in the street to see the street lighting switched on and subsequently attended a meeting to hear speeches on electricity and tariffs.

The cooking for the dinner celebrating the occasion was undertaken in cookers manufactured by the Simplex Electric Co., Ltd. At the dinner tributes were paid to the energy and enterprise of Councillor J. Boothman, J.P., the chairman of the Clitheroe Electricity Committee, who in his reply said that work had commenced on the line from Chaigley on July 29th, nine weeks ago, and its erection had included two sub-stations, over 300 poles, 120 stays, and some thirty miles of copper conductor. "For cooking, heating and water heating why should you continue to cart coal from Longridge station when you can do all this by using electricity from the works at Padiham?" he asked. Electricity was going to play an important part in the revival of agriculture. He stressed its advantages for lighting, pumping, milking, cooling, separating and churning, for keeping young pigs warm and for incubation and brooding.

Mr. J. F. Simpson, M.I.E.E., borough electrical engineer, of Preston, commended Mr. A. H. Todd, engineer and manager, Clitheroe Electricity Department, for the exceptional expedition and engineering skill shown in carrying out the Chipping extension. The Lancashire Electric Power Co., which supplies electricity in bulk at 11,000 V to the Clitheroe undertaking, was represented by Mr. N. H. Bridge, who expressed the regret of Mr. C. D. Taite, engineer and manager of the company, for his absence.

Mr. W. Dagger, a well-known pig-breeder, of Preston, said that in his opinion both the national pig and milk schemes would be carried through successfully by the greater use of electricity on the farms. He had found electricity an absolute boon in pig keeping. It was the first few days of a pig's life that were the most important; if the litter could be kept alive for two to three days there was every chance of the young pigs thriving, and he had found that the electrical system he had employed for keeping the young pigs warm had been a great success. Even in the blizzard of last year when he had at least a dozen litters of pigs, scarcely one of the youngsters died; without electricity 50 per cent. of the pigs would have been lost. Electricity would be still more needed in the pig scheme as litters would be required every month of the year to keep supplies steady. His advice to farmers was not to restrict the number of plugs and to use electricity wherever they could. It would be found extremely useful in cheese- and butter-making, and his prediction was that in five or ten years' time many dairy farmers would have installed milking machines. They might as well get in at the beginning and have the benefit of the saving from the start. At Mr. Dagger's invitation parties of farmers are to be shown over his premises, and it is to be hoped that good results will accrue from their visit.



The group at the switching on of the Chipping supply. (Inset: Mr. A. H. Todd, the Clitheroe engineer)

When the supply was switched on there were sixty consumers actually connected and ten cookers were already installed together with two water heaters; every consumer had purchased an electric iron.

Electricity Supply

Lighting, Domestic, Power

Abingdon.—UNDERTAKING NOT TO BE PURCHASED.—The Council has decided not to exercise its power to purchase the local electricity undertaking.

Amersham.—SUPPLY TO PENN STREET.—The Electricity Commissioners have granted to the Chesham Electric Light & Power Co. authority to supply electricity to the villages of Penn Street and Winchmore Hill, which are outside the company's area of supply, and in the area of the Rural District Council.

Australia.—VICTORIAN COMMISSION'S PROFIT.—A statement issued by the Victorian Electricity Commission shows that for the financial year ended June 30th there was a net profit of £3,429. The operating accounts reveal a surplus of £353,506 on electricity supply, a loss of £18,842 on briquetting, and a loss of £13,852 on the Geelong tramways, making a gross surplus of £320,812. Special expenditure amounts to £23,668, leaving £297,144. Included in the special expenditure is £16,899 for the administration of the Electric Light and Power Act. Until two years ago this cost was paid out of consolidated revenue, and it is understood that the Commission objects to being compelled to pay the entire cost of administration. Other items which are deducted before arriving at the net profit are: Exchange, £146,644; contingency reserves, £80,000; provident fund, £26,486; redemption of debentures, £23,585; loan flotation expenses, £12,000; and writings-off, £5,000, making a total of £293,715. Although conditions were unfavourable to direct reductions in the standard tariffs, the automatic features of these enabled benefits to accrue to metropolitan and country consumers during 1932-33 to the extent of £60,000. Regarding the sale of electrical appliances, the Commission reports that the expenditure totalled £94,270, and revenue £92,084, a deficit of £2,186 after providing for interest and depreciation. On the operation of the Geelong tramways there was an improvement of £3,768 on the loss of the preceding year, this being due to reductions in operating expenses. Revenue declined by £1,300, and passenger traffic by 172,000.

BARRON FALLS SCHEME.—Work has ceased on the Barron Falls hydro-electric scheme, states our Sydney correspondent, as the rock higher up the gorge is likely to be dangerous to the power house.

Bognor Regis.—EXTENSIONS.—An overhead l.p. line has recently been installed to serve the village of Bilsham and the new estate of Yapton Gardens. A two-part tariff is available in this area, with a "unit" charge of 1d.

Bridlington.—OFFER TO PURCHASE.—The Town Council has declined an offer for the purchase of the electricity undertaking referred to last week.

Douglas (I.O.M.).—ASSISTED WIRING.—Mr. J. P. Tucker, engineer and secretary of the Isle of Man Electricity Board, has sent us details of an assisted-wiring scheme which is now available to consumers.

Eastbourne.—SUPPLY EXTENSION.—The Electricity Committee is to provide supply to the Southlands Estate, Polegate, at a cost of £1,011.

LOAN FOR COOKERS.—The Committee is applying for sanction to a loan of £5,000 for the purchase of cookers.

FLOODLIGHTING TARIFF.—In order to encourage outside floodlighting, signs, and decorative lighting, the Committee has adopted a suggestion of the engineer for the following alternative to the existing flat rate tariff: Where the total load installed is 2 kW or over, a charge of ¾d. per kWh for all energy consumed, plus a fixed charge of £5 per kW of lighting installed, payable in advance, such tariff to be adopted for not less than one year.

Egham.—LIGHTING OF COUNCIL HOUSES.—The Council is considering the question of lighting the Council houses by electricity. The estimates for gas lighting were lower than those for electricity, but the Council considers that the installation of electricity would bring about a saving in decorations, and negotiations have therefore begun with Egham & Staines Electricity Co., Ltd.

Finchley.—FRINGE ORDER.—The Electricity Committee reports that the North Metropolitan Electric Power Supply Co. has obtained a Fringe Order to supply certain premises on the Halliwick Manor Estate.

EXTENSIONS.—The Committee is to extend mains at a cost of £1,420.

France.—ELECTRICITY SUPPLY PROGRESS.—The output of the principal power stations in France, representing about 93.5 per cent. of the total production, during the six months ended June last amounted to 4,865,331,396 kWh as compared with 4,526,197,412 kWh in the corresponding period a year ago, an increase of 7.49 per cent. Hydro-electric plants generated 2,839,837,387 kWh and steam and internal-combustion-engined stations 2,025,494,000 kWh.

Glasgow.—MAINS EXTENSIONS.—The Electricity Committee is to lay distributing mains at a cost of £1,256.

ASSISTED-WIRING PROGRESS.—Under the Electricity Department's scheme sixty-seven houses were wired in August, making a total to date of 38,035. Hired appliances numbered two, making the total 17,534.

SHETTLESTON AND TOLLCROSS AREA.—Regarding the supply of electricity in the Shettleston and Tollcross area, the Town Clerk has reported to the Electricity Committee the conclusion of negotiations with the Clyde Valley Electrical Power Co. for (1) the termination of the bulk-supply agreement between the company and Lanarkshire County Council, under which the Corporation requires to purchase from the company the electricity needed for the said area till December 31st, 1939; and (2) the Corporation taking over from the Clyde Valley Co. the whole supply of electricity to power consumers and others in the area, under which the company has agreed to the cancellation of the said agreement and to the Corporation taking over the whole supply of electricity in the area on conditions set forth, and on payment to it by the Corporation of £10,242 for good will and assets and £454 for rental of apparatus for one year. The Town Clerk was authorised to include in a Provisional Order to be promoted by the Corporation the necessary clauses to confirm the arrangement for the taking over by the Corporation of the whole supply of electricity in the Shettleston and Tollcross area.

Guildford.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains to Burpham at an estimated cost of £288.

India.—A TRAVANCORE SCHEME.—The Government of Travancore has sanctioned an estimate of about £16,000 for carrying out an electricity supply scheme in the town of Quilon. The estimate provides for a Diesel engine station, fifteen miles of overhead lines, and two sub-stations. There will be 200 connections in the first stage. The plan will form part of the Pallivasal hydro-electric scheme.

Inverkip.—ELECTRIC STREET LIGHTING.—The ratepayers have decided unanimously on a scheme for lighting the streets by electricity.

Italy.—ELECTRICITY SUPPLY PROGRESS.—The capacity of the electric power stations in Italy at the end of July last amounted to 4,510,000 kW as compared with 4,455,000 kW at the corresponding date a year ago, an increase of 1.23 per cent. Of the total, hydro-electric plants are responsible for 3,712,000 kW and steam and internal-combustion-engined stations for 798,000 kW. The output of electricity in Italy during the seven months ending with July last is estimated at 6,155,740,000 kWh, an increase of 9.23 per cent. over the similar period of 1932.

Japan.—NEW POWER SCHEMES.—During the past few months a number of power schemes have been commenced, no fewer than eighteen new projects, involving a total of 127,000 kW, being started in August. Several schemes are announced for the Kyushu District, where there has been little activity in the past, and applications have been received by the Communications Department from the Kumototo, Kumagawa, and Kagoshima Electric Companies for permission to proceed with power development projects. A further report from our Yokahama Correspondent says that the "Power League" has approved of projects for new power stations and additions to present stations which increase the total output by nearly 500,000 kW.

Kingsbury.—"OSIRA" STREET LIGHTING.—The North Metropolitan Electric Power Supply Co. has recently erected twenty-seven standards along about two miles of the Kingsbury Road. The system employed involves the use of 400-W "Osira" lamps in lanterns specially designed for the purpose by the General Electric Co., Ltd. The new lighting replaces 40-W lamps mounted on swan-neck brackets, and a considerable improvement in the illumination of the road surface has been made. The arrangement is such that twice as much light is directed in the way of the traffic flow as in the opposite direction.

Linton.—ELECTRIC STREET LIGHTING.—The Parish Council has decided to adopt electricity for public lighting, at a cost of £162 for the installation. The supply will be taken from Burton-on-Trent Corporation.

London.—BATTERSEA.—The Electricity Committee is to provide services to 306 premises at a cost of £2,702; replace old vulcanised bitumen mains with armoured cable at a cost of £750; and provide additional switchgear at St. John's Estate sub-station at a cost of £70. The Committee is also to erect a sub-station and two maisonettes at Grayshott Road at a cost of £2,226.

FULHAM.—The Electricity Committee recommends paying the Port of London Authority the full cost of deepening the river bed towards the Surrey bank for the purpose of the proposed new coaling jetty (such cost being estimated at a sum not exceeding £3,000). The Electricity Committee is to extend mains at a cost of £1,370, and has obtained sanction to loans of £1,208 for sub-station and equipment at Messrs. Loud & Western's premises in Broughton Road, £1,490 for a sub-station in Lillie Road, £630 for a supply to Drayton Paper Works, and £320 for providing electricity for the Stamford Bridge Stadium.

HAMMERSMITH.—The Electricity Committee is to improve lighting in various streets at a cost of £545.

POPLAR.—The Electricity Committee has obtained sanction to a loan of £10,308 for a scheme for the security of the supply to the Isle of Dogs. It has also arranged, at a cost of about £1,000, to provide additional electricity supply to the British Oil & Cake Mills, Ltd., Orchard Place, Blackwall.

Lothians. — ASSISTED-WIRING AGREEMENT. — The Lothians Electric Power Co. has decided to supply, in approved cases, four or more lighting or heating points to any house, by payment of 10 per cent. of the cost, on the following conditions: Scale 1: Ordinary lighting flat rate through a prepayment meter, plus 1½d. per kWh; no separate meter rent to be charged and the consumer to receive a rebate of ½d. per kWh for the amount consumed in excess of 200 kWh per annum. Scale 2: The normal annual fixed charges, plus 1s. per quarter for each point. In the case of a cooker obtained on hire at 4s. per quarter the consumer may pay the cost of installing the cooker immediately or at 1s. per quarter.

Mansfield.—SUB-STATION.—The Electricity Committee is to erect a sub-station in Oak Tree Lane.

Margate.—TARIFF AGREEMENT.—The Town Council has entered into an agreement with the Isle of Thanet Electric Supply Co., Ltd., with reference to the charges in force. It has been provisionally agreed that there shall be a limitation of the company's profits to approximately 10 per cent., and all in excess is to be transferred to a suspense account and applied to future reductions. A two-part tariff is to be introduced with a "unit" charge of about 1½d. for business premises, and of about 1d. for private houses.

Mountain Ash. — ANNUAL REPORT. — The annual report and statement of accounts for the year ended March 31st, 1933, show that, despite the acute depression and consequent diminishing purchasing power, the amount of electricity sold was 3.2 per cent. higher than in the previous year. During the year the loan debt was extinguished and the lighting rate lowered to 2½d. per kWh. The profit for the year amounted to £6,314, which was £2,412 lower than in the previous year. With no future loan charges and a reserve fund of £16,000 for contingencies the electrical engineer (Mr. E. W. Jones) felt justified in recommending the Council to put into operation for the quarter ending December, 1933, a bonus discount of 1d. per kWh, making the charge for lighting for this particular quarter 1½d. per kWh compared with the normal rate of 2½d. Meter rents are to be reduced from 1s. 3d. to 9d. per quarter.

Newbury. — SUB-STATION. — Edmundson's Electricity Corporation is to erect a sub-station at the rear of Catherine Wheel, Newbury.

Oxford.—LOANS.—The Electricity Committee has obtained sanction for a loan of £6,600 for electricity meters, and is seeking permission to borrow £10,000 for hire-purchase wiring and £10,000 for apparatus.

LIGHTING DEMONSTRATION.—The Committee has asked the engineer to provide a suitable hall for a demonstration of modern lighting effects to be given during the first week in December by the Lighting Service Bureau.

Pembury.—ELECTRIC STREET LIGHTING.—A Parish meeting has decided to adopt the Street Lighting Act. The scheme will be carried out by the Tunbridge Wells Electricity Department, and will provide seventy-five lights at an estimated cost of £1,220.

Penarth.—OVERHEAD LINE INQUIRY.—Strong opposition was offered last week by the Urban District Council during an inquiry into an application by the Penarth Electric Lighting Co., Ltd., to the Ministry of Transport for permission to erect poles and overhead wires in certain streets of Penarth, Cogan, and Llandough. Presenting the case for the company, Mr. H. Bentham, advisory engineer, said that 1,500 houses of the working-class type were covered by the project, under which it was proposed to erect simple overhead lines through certain streets. The company proposed to wire the houses and cover the cost by increasing the price of the electricity by 2d. per kWh, bringing it up to 9d. a kWh. While underground cable would cost £1,200, the overhead system worked out at only £350 a mile, and, if the latter were adopted, the entire scheme would cost £10,000 as compared with £18,000 if the cables were laid underground. For the Penarth District Council it was argued that the amenities of the town should be preserved. It was submitted that there was no evidence to show that there would be a demand for electricity in the districts to be served, for experience had proved that in other districts of a similar type where facilities were already offered that there was little or no demand for electricity because the charges were excessive. Petitions were put in by residents objecting to the erection of poles and overhead wires.

Ripon.—CLAIMS RESULT FROM BREAKDOWN.—The Corporation Electricity Committee has received from the proprietor of the Palladium Picture House an application for payment of £10 estimated damages sustained by the alleged failure of the electricity supply on July 29th. The town clerk reported the receipt of a similar communication from the proprietor of the Opera House, claiming £10 in respect of the alleged failures on July 29th and August 2nd. The Committee decided to express regret at the inconvenience caused, and to state that after full consideration of the circumstances it was unable to comply with the requests.

Russia.—CONTINUED ELECTRICAL DEVELOPMENT.—According to the *Soviet Union Year Book* Press Service, generating sets aggregating 800,000 kW in capacity are now under construction. Among the most important of these are a 44,000-kW set for the Shatura station; three 24,000-kW sets for the No. 3 Svir station, which is to commence operation this year; two 62,000-kW sets for the Dnieprostroi hydro-electric undertaking; and a 46,000-kW set for the Gorki hydro-electric station.

Scunthorpe.—BULK SUPPLY.—The Urban District Council has agreed to supply electricity to the North Lincs and Howdenshire Electricity Co., a subsidiary of the Yorkshire Electric Power Co., at the rate of 0.78d. per kWh.

Southend-on-Sea.—SUPPLY TO HIGHLANDS ESTATE.—The County of London Electric Supply Co., Ltd., has agreed to the Corporation furnishing a supply of electricity to houses to be erected on the portion of the Highlands Estate west of the borough boundary.

"Osira" lighting installed by the "Northmet" Co. on the Kingsbury Road

LOANS.—A loan of £2,500, to cover the cost of unspecified apparatus required from time to time in connection with additions or alterations to transformer stations and sub-stations, has been applied for. Sanction to a loan of £25,000 for mains has been received.

DEMONSTRATION.—A demonstration of electrical apparatus, of interest to builders and architects, is to be arranged at the showrooms, and the borough electrical engineer is to report as to the acquisition of a site for a showroom at Shoeburyness which has recently been absorbed into the county borough

South Shields.—THE C.E.B. TAKES OVER.—At a meeting of the Electricity Committee a letter was read from the Central Electricity Board stating that it would commence operating the power station from October 1st, and that the station would be shut down during October and thereafter would be operated as a one-shift station during the months of November, December, January, and, probably, February.

Staindrop.—A SUPPLY BY THE WINTER.—The North-Eastern Electric Supply Co., Ltd., is preparing to supply electricity to the parish; it will be available for the coming winter.

Stoke-on-Trent.—REDUCED CHARGES.—The Electricity Committee has agreed to provide a supply of electricity to cinemas at 3d. per kWh for the first 1,000 kWh consumed per month and 2½d. per kWh for all energy used in excess of this amount; and for electric baking ovens at the reduced rate of ½d. per kWh.

ASSISTED WIRING.—The Committee has decided to extend the assisted-wiring scheme to prepayment-meter consumers and to make a charge of 1½d. per kWh extra to the prepayment-meter rate to cover wiring.

Strood.—SUPPLY EXTENSION.—The Kent Electric Power Co. has informed the Rural District Council of its intention to extend the supply in the Higham district by means of overhead lines.

Sunderland.—NEW CABLES.—The Electricity Committee is to re-lay cables in Southwick Road at a cost of £864.

Todmorden.—LOAN.—The Electricity Committee is seeking permission to borrow £3,000 for transformers and switchgear.

Towyn (Merionethshire).—HYDRO-ELECTRIC SCHEME REJECTED.—Some time ago, Mr. R. J. Roberts, a local chemist, bequeathed to the town the Dolgoch Waterfalls, which he stated could be used for generating electricity for supply to the town, provided that the consent of three-quarters of the ratepayers could be obtained. The Dolgoch Trustees have decided, however, that the erection of the necessary buildings for this purpose would spoil the appearance of the valley, and have refused to sanction the erection of a hydro-electric station.

Traction

Australia.—DIESEL-ELECTRIC TRACTION IN VICTORIA.—The Victorian Railway Commissioners are obtaining tenders from overseas manufacturers for the supply of Diesel-electric equipment for locomotives.

Japan.—UNDERGROUND RAILWAY IN OSAKA.—The first section of an underground railway in the city of Osaka—that between Umeda and Shinsaibashi—has lately been completed and opened for traffic. The tunnel, which is box-shaped and accommodates two rail tracks, measures approximately 16 ft. in height and 27 ft. in width; its depth below ground varies between 10 ft. and 28 ft. The line is operated on the third-rail system at 750 V d.c., the power being supplied from a sub-station at Umeda, where 22,000 V a.c. is converted to d.c. by two sets of 2,000-kW rotary convertors.

London.—ELECTRICITY FOR TRAMWAYS.—The London Passenger Transport Board states that an examination of the charges made by the authorities to their tramway departments showed a wide divergence, and it was therefore necessary to consider a common basis for charges which could be applied with equity to each undertaking and which was suggested should apply, in the first instance, for a period of twelve months. The Board has asked the electricity authorities to agree to a suggested scale which has been prepared with a view to avoiding any necessity for individual negotiation or arbitration with separate undertakings. Under the tariff proposed the cost of power would be much above that at which the Board could supply itself. This suggested scale could only apply if accepted by all the electricity undertakings, and is subject to confirmation by the Board. The proposed scale of payment for electricity supply to the Board is: Up to the first million kWh, 0.9d. per kWh; for the second million, 0.8d. per kWh; for the third million, 0.7d. per kWh; for all electricity in excess, 0.65d. per kWh. The price covers low-pressure current metered at the converting plant, and also covers all current used by the Board at sheds, depôts, and offices. The terms would apply for twelve months, and would thereafter be subject to review by either party by giving three months' notice. No coal clause would apply during the first twelve months.

SOUTHERN RAILWAY MISHAP REPORT.—The Ministry of Transport, reporting on the Southern Railway accident on April 25th, when a twelve-coach express electric train from Brighton collided with the platform buffer at Victoria Station, states that the cause was an error of judgment in handling the brake on the part of the motorman. The response of the ordinary Westinghouse brake equipment to the motorman's actions is not instantaneous. Consequently, more dexterous operation of the brake is needed on long trains than on short ones.

Middlesbrough.—The Council has decided to scrap its tramway system and replace it with a bus service. The chairman of the Tramways Committee (Councillor J. Hamill) strongly advised the Council to introduce a trolley-bus system.

South Africa.—RAILWAY ELECTRIFICATION.—Some new features designed to give savings in construction and operating costs are to be introduced in the electrification of a section of the South African Government Railways from Ladysmith, in Natal, to Harrismith, in the Orange Free State. Sanction for the work to be undertaken has just been given by the railways administration, and it is expected that it will be completed before the end of next year, the length being about fifty miles. The voltage is 88,000 a.c., and the line will be carried on overhead masts. The h.p. line will be well out of reach of the overhead equipment, and at sub-stations the energy will be converted to 3,000 V d.c. Instead of making concrete foundations on the spot for the masts, specially designed pre-cast reinforced sleepers will be made locally and placed in position underground to receive the masts, which can simply be bolted into position. Scrap rails are being used for the masts. A saving of £40,000 a year in operating costs is anticipated.

Switzerland.—RAILWAY POWER CONSUMPTION.—The output of the various electric power stations belonging to the Swiss Federal Railway Department which supply the energy required for the electrified sections of the Swiss railways amounted during last year to 482,854,000 kWh as compared with 506,238,000 kWh in 1931. The Amsteg and Ritom hydro-electric plants supplied 257,103,000 kWh, the Vernayez and Barberine stations 210,622,000 kWh, and the Massaboden plant 15,131,000 kWh. In addition, 63,230,000 kWh was taken from privately owned power stations.

FURTHER RAILWAY ELECTRIFICATION.—In order to relieve the unemployment in the country the Swiss Federal railway authorities are reported to have commenced work on the electrification of the railway between Lucerne and Berne.

Communications

Australia.—RADIO LICENCES.—More broadcast receiving licences were issued during the year ended June, 1933, than in any previous year. The total reached 469,477, an increase of 99,532 for the year, the increase for the month of June being 10,470. The numbers in use in each State were: New South Wales, 178,387; Victoria, 171,318; Queensland, 36,314; South Australia, 50,261; Western Australia, 20,604; and Tasmania, 12,593.

Germany.—RADIO LICENCE DECLINE.—The total number of listeners was 4,470,862 on September 1st, 1933, representing a decrease of 12,416 over the figure for August 1st of this year. The number of free licences issued to unemployed persons now totals 525,808, or 5,422 less than on August 1st. The total decrease since May 1st, 1933, is nearly 90,000, whereas the number of free licences has decreased by only about 20,000, says *World-Radio*. During the quarter April to June, 1933, 373 cases were discovered of unlicensed listening; 245 offenders were found guilty and were sentenced to various fines, seven persons were acquitted, and in 122 cases prosecution was discontinued. During the preceding quarter the number of persons found guilty of radio "piracy" was 213.

Great Britain.—RADIO RELAY SERVICES.—The Mansfield Corporation has granted permission to the Notts and Derby Radio Relays, Ltd., to cross streets with wires for a relay service.

The Barking Corporation Highways Committee is considering an application from Universal Wireless Relay, Ltd., for permission to operate a system.

The Manchester Corporation has appointed a sub-committee to visit certain towns for the purpose of investigating the operation of relay services.

RADIO LICENCE EVASION.—The Postmaster-General announces that during September 219 unlicensed broadcast listeners were prosecuted in England, Wales, and Scotland, and that a conviction was secured in every case. There were no prosecutions in Northern Ireland. The Post Office detection campaign commences this month in the North-East Coast area.

Holland.—BROADCASTING CONFERENCE.—The International Broadcasting Union, of which Sir Charles Carpendale is president, is meeting at Amsterdam this week. Representatives of the administrative, engineering, and programme departments of the B.B.C. are attending. Seven Continental countries have not yet agreed to abide by the Lucerne wavelength redistribution plan, which is to take effect on January 15th, 1934.

Hungary.—NEW RADIO STATION.—Two aerial towers are being built just outside Budapest for a new broadcasting station, which will be three times more powerful than the existing transmitter, says *Reuter*. After five months' work half of one of these steel structures has been erected; when finished it will be 1,045 ft. high, cigar shaped, with guys 2.5 in. thick, and an adjustable flagpole at the top for tuning. Messrs. Milliken Bros., Ltd., London, are responsible for the design of the tower and the supervision of its erection.

India.—WIRELESS LICENCES.—In moving consideration of the India Wireless Telegraphy Bill in the Assembly, Sir Frank Noyce stated that the number of broadcast receiving licences in 1932 was 8,557. In the first six months of this year the number issued was 5,276. The total receipts from the Customs duty on imported sets were expected to exceed £22,000 this year.

BOMBAY-DELHI TELEPHONE.—Since carrier telephony has been installed between Bombay and Delhi the number of calls through Delhi has enormously increased. It is now proposed to install the carrier system between Delhi and Calcutta, while the extension of the overseas telephone system to Delhi and the towns in Northern India is expected to take place within a fortnight. Most of the telephone calls between Delhi and Bombay are business calls. Overseas calls have shown no tangible increase, probably due to the high charge levied.

Jugo-Slavia.—LICENSED LISTENERS.—A large increase in the number of listeners is expected to result from the opening of the new transmitting station at Belgrade. There is keen competition in the business in receiving sets, notably from Dutch and American makers, but the market is worth investigation, for the number of people possessing such sets is at present small. In Belgrade there are said to be 33,000 subscribers, in Zagreb 18,000, and in Ljubljana 12,000.

Manchukuo.—WIRELESS EXTENSION.—The Mukden Telegraphic Administration has commenced the establishment of radio stations at Tunhwa, Tungliao, Taonan, Yingkou, and Antung, and to provide long-distance communication between Mukden and Jehol is negotiating for the enlargement of the power plants at the existing stations at Mukden, Shanhaikwan, and Peipiao.

TELEPHONE NETWORK.—The newly formed Manchuria Telegraph & Telephone Co., 450,000 of whose 1,000,000 shares are held by the Japanese and Manchukuo Governments, has called up the first quarter of the share money, *viz.*, 6,875,000 yen. Work has just been commenced on a network of telegraph and telephone lines, and a total of 1,475 miles is due for completion by the end of 1934.

Portugal.—STATE RADIO MONOPOLY.—Since State control came into force on September 1st, together with the annual tax of Esc.72/00 (twelve shillings), forms have been issued, and heavy fines are to be inflicted for any failure to register receiving sets, says *World-Radio*. The presence of an outside aerial will be taken as proof that a set is in use.

South Africa.—TELEPHONE INCREASE IN JOHANNESBURG.—During the past sixteen months orders have been received in Johannesburg and district for over 10,000 telephones. The automatic system was introduced last year.

Sweden.—INTERNATIONAL TELEPHONY.—Telephone services have recently been established between Sweden and Algiers and Tunis, and between Sweden and Colombia and Peru.

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Australia.—MELBOURNE.—Post and Telegraph Department. October 31st. Condensers for use in radio transmiters. (A.Y. 11983.)*
October 17th. Polarised relays. (A.Y. 11999.)*
November 28th. Lead-sheathed switchboard cable. (A.Y. 12002.)*
November 21st. Telephone terminal strips. (A.Y. 11996.)*
November 14th. Ringing dynamotors. (A.Y. 11984.)* Telephone ringers. (A.Y. 11986.)* Submarine telephone cable. (A.Y. 11973.)*
October 30th. State Electricity Commission of Victoria. 6,600-C current-limiting reactors. (A.Y. 11971.)*

Barking.—October 24th. Electricity Department. L.p. cable. (See this issue.)

Bolton.—October 18th. Electricity Department. Electrical installation in 360 houses, &c. (September 29th.)

Dumbarton.—October 6th. County Council. Electrically operated swing bridge over the Forth and Clyde Canal at Erskine Ferry Road, Old Kilpatrick. Messrs. Crouch & Hogg, chartered civil engineers, 17, Lynedoch Street, Glasgow (deposit £5 5s.).

Egypt.—CAIRO.—November 14th. Ministry of the Interior. Pumps, electric motors, boilers, &c. (G.Y. 12912.)*

ALEXANDRIA.—October 25th. Ports and Lighthouses Administration. Electric cables, switchgear, transformers, electrically driven hauling winches and motors for the port of Alexandria. Chief inspecting engineer, Egyptian Government, 41, Tothill Street, London, S.W.1. (Specifications, &c., 12s., not returnable.)

Exeter. October 12th. Corporation. Installation of electric lighting in 302 houses on the St. Loye's Estate. Tenders to the city architect, Mr. John Bennett.

Grays Thurrock.—October 11th. Electricity Department. Transformer kiosks, h.p. switchgear, 3,300-V and l.p. cables, &c. (September 22nd.)

India.—NEW DELHI.—December 4th. Indian Stores Department. 220/230-V, single-phase, 50-cycle ceiling fans. (A.Y. 11959.)*
December 11th. D.c. ceiling fans. (A.Y. 11965.)*
January 8th. A.c. and d.c. table fans. (A.Y. 11967.)*
October 25th. A.c. and d.c. meters. (A.Y. 11968.)*

London—SOUTHWARK.—November 1st. Borough Council. Electric cables for twelve months ending November 30th, 1934. (September 29th.)

New Zealand.—WELLINGTON.—October 26th. Post and Telegraph Department. 12-V switchboard lamps (A.Y. 11955)* and telephone gongs and attachment nuts. (A.Y. 11956.)*
October 31st. Metal-cased condensers. (A.Y. 11954.)*

Pontypridd.—October 19th. Electricity Department. Supply, delivery and laying about 2,400 yd. of l.p. cable. (See this issue.)

South Africa.—JOHANNESBURG.—October 28th. City Council. Five sets of electrically operated traffic signals. (A.Y. 1191.)*
November 4th. Ten 50-h.p. tramcar motors. (A.Y. 12001.)*
November 4th. Tramway traction recorder. (A.Y. 12003.)*

KROONSTAD.—December 4th. Machinery and plant for a power station. (A.Y. 12004.)*
December 4th. Steam raising plant. (G.Y. 13028.)*
October 14th. Six 3-phase, metal-clad h.p. switchgear units. (A.Y. 11981.)* Metal-clad l.p., a.c. switchgear. (A.Y. 11980.)*
October 28th. Two single-phase 1,620-kVA transformers. (A.Y. 11982.)*

CAPE TOWN.—November 29th. Electricity Department. Fifty automatic street-lighting controllers. (A.Y. 11994.)*
November 1st. House service meters. (A.Y. 12000.)*

Swansea.—October 9th. Electricity Department. Coal-handling plant for the new Tir John power station. (September 8th.)

Thornbury (NEAR BRADFORD).—October 14th. Calverley Joint Hospital Board. Installation of electricity at Hospital. Inquiries, Mr. J. E. Storr, 6 and 7, South Parade, Leeds, or Mr. W. R. Wilson, 12, Park Square, Leeds, clerk to the Board. Tenders (£2 2s. deposit) to Mr. Wilson.

Warwickshire.—October 19th. County Council. Electric wiring of the nurses' home extension of the Warwick County and Coventry City Joint Mental Hospital, Hatton, near Warwick. Tenders to Mr. H. M. Blenkinsop, Warwick. Specifications and drawings from Mr. A. B. Mallinson, 44, Brazennose Street, Manchester.

* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, S.W.1.

Contracts Closed

Barking.—Electricity Committee. Accepted. Cable (£107).—Enfield Cable Works, Ltd. (£107); Callender's Cable & Construction Co., Ltd. (£107).

Birmingham.—Education Committee. Accepted. Electric lighting installation at Hope Street Council School (£318).—Gordon Hughes Electrical Co., Ltd.

Chelmsford.—Essex County Council. Accepted. Electric lighting at county office extensions (£376).—J. Gripper, Ltd.

Dundee.—Works Committee. Accepted. Fourteen electrical clocks and a transformer in the new municipal offices (£119).—Dykes Bros.

Eastbourne.—Electricity Committee. Recommended. Erection of e.h.p. transmission lines and l.p. distribution lines for Sayerlands and Hankham (£1,412).—W. T. Henley's Telegraph Works Co., Ltd.

Gillingham.—Town Council. Accepted. Installation of electric lighting in 136 houses.—S. Edwards.

Glasgow.—Corporation Cleansing Committee. Accepted. Battery for electric vehicle (£250, subject to an allowance of £25 for existing battery).—Tudor Accumulator Co., Ltd.

Guildford.—Town Council. Accepted. Installation of electric lighting at Millmead House (£90).—J. L. Shadwell.

Kirkcudbright.—Town Council. Accepted. Installation of electric lighting in the Town Hall (£71).—Messrs. Fairweather.

London.—POPLAR.—Highways Committee. Recommended. Automatic traffic signals in Brunswick Road (£310).—Automatic Electric Co., Ltd.
PADDINGTON.—Baths Committee. Recommended. Battery renewals at baths (£121).—D.P. Battery Co., Ltd.

Manchester.—Electricity Committee. Recommended. Electrically driven vehicle battery replacements.—Chloride Electrical Storage Co., Ltd.; D.P. Battery Co., Ltd. Cable, joint boxes, &c.—Pirelli-General Cable Works, Ltd. 30-cwt. electrically propelled van.—Electricars, Ltd.
Rivers Committee. Accepted. Electrical equipment at Davyhulme sewage works extensions.—W. J. Furze & Co. (Manchester), Ltd.
Highways Committee. Accepted. Traffic signs.—Forest City Electric Co., Ltd.
Education Committee. Accepted. Electrical installation at Crosslee school.—John Collier, Ltd.

Rowley Regis.—Urban District Council. Accepted. Lighting equipment of the 146 houses on the site at Gorsty Hill, subject to the contractors substituting Association grade cable for the cable specified (£533).—Electromobile Engineering Co.

Sheffield.—Electric Supply Committee. Accepted. Additional sub-station switchgear (£3,209).—A. Reyrolle & Co., Ltd. Six 300-kVA and four 450-kVA transformers (£1,579).—Electric Construction Co., Ltd.

Stoke-on-Trent.—Housing Committee. Accepted. Wiring and fittings for Council houses.—Fifty at Carmountside, Oakes & Liversage; fifty-two at Meir, J. Whittaker; sixty-six at Meir, E. Holloway.

Warrington.—Electricity Committee. Accepted. H.p. and l.p. cables.—British Insulated Cables, Ltd. Turbo-feed pump (£230).—G. & J. Weir & Co., Ltd.—Floodlighting at electricity showrooms, Buttermarket Street.—General Electric Co., Ltd.

Forthcoming Events

Illuminating Engineering Society.—Tuesday, October 10th. Lighting Service Bureau, W.C. 6.30 p.m. Presidential address by Mr. C. W. Sully.

Television Society.—Wednesday, October 11th. University College, W.C. 7 p.m. "Television at the 1933 Berlin Radio Exhibition." Mr. E. H. Traub.

Institution of Engineers-in-Charge.—Wednesday, October 11th. Institution, London. 7.30 p.m. Presidential address. Lt.-Col. J. D. K. Restler.

Institution of Electrical Engineers (*North-Eastern Students' Section*).—Friday, October 13th. Armstrong College, Newcastle-upon-Tyne. 7.15 p.m. Chairman's address. "The Rating and Performance of Circuit Breakers." Mr. R. W. L. Harris.

Institution of Engineers and Shipbuilders in Scotland.—Friday, October 13th. Grosvenor Restaurant, Glasgow. "James Watt" dinner.

Diesel Engine Users' Association.—Thursday, October 12th. Caxton Hall, Westminster, S.W. 3 p.m. Joint meeting with the Institution of Chemical Engineers. "The Treatment of Cooling Water for Diesel Engines." Mr. L. O. Newton

Junior Institution of Engineers.—Friday, October 13th. Institution, London. 7.30 p.m. "The Influence of Harmonics in Transformer Circuits." Mr. E. Ambrose.

Welded Marine Boilers

IN his presidential address to the Institute of Marine Engineers in London on October 3rd, Sir S. George Higgins predicted that the period upon which marine engineers were now entering might be remembered for the great increase in the use of welding and the employment of high-pressure and high-temperature steam. The reason for the employment of welding in this direction was the desire to obtain a vessel which was cheaper than a solid forged drum or one having a riveted joint, and if it could be shown that the finished article was entirely reliable—and this was a primary consideration in anything pertaining to the machinery of ships—a definite step in the advancement of marine engineering would result.

The successful employment of electric welding was of the greatest interest to the manufacturers of water-tube boilers, since it appeared that marine engineers were gaining confidence in this type of boiler, which was specially suitable for use with mechanical stokers. If, as had been suggested, we were entering on a period when higher pressures of steam would be necessary for purposes of economy, it seemed that the increased employment of steam turbine machinery in merchant ships must also occur. Therefore, it appeared to the president that there must be good reason for optimism as regarded the future use of coal, or its derivatives, as fuel for ships, and consequently a hopeful outlook for the coal industry, whose well-being was so great a factor in British prosperity.

Notes

British Standard Specifications

The British Standards Institution has issued its half-yearly handbook (Ref. C.D.800) which includes the report presented at the last annual general meeting as well as the indexed list of current British Standard Specifications. The report on the activities of the three divisions, Engineering, Building and Chemical, shows the enormous amount of valuable work voluntarily carried out by the Institution's six hundred technical committees. The section devoted to lists of Standard Specifications includes a numerical list, the new Specifications in course of preparation, and a complete subject index. This index should be in the hands of all drawing offices and purchasing departments of public authorities and firms throughout the engineering, building, chemical and allied industries. Copies may be obtained from the Institution's Publications Department, 28, Victoria Street, S.W.1, price 1s. 2d. post free.

The Manchester Athenæum Electrical Club

This club has arranged a winter programme, and at its Friday luncheons short talks on subjects of interest to the trade are given by well-known people in the electrical world. For the next four weeks the programme is as follows:—October 6th: Address by Mr. Howarth, of the Lancashire Electric Power Co.; October 13th: Address by Prof. Hollingworth; October 20th: Film on cable making by Callender's Cable & Construction Co., Ltd.; October 27th: Address by Mr. N. Simpkin, of the Lancashire and Cheshire Coal Research Association.

Electrical Engineers' Dance, Manchester

A dinner-dance for electrical engineers will be held at the Midland Hotel, Manchester, on Friday, December 15th. Tickets, £1 1s. each, may be obtained from the hon. secretary, Mr. C. D. Taite, National Buildings, St. Mary's Parsonage, Manchester, from the hon. treasurer, Mr. J. Harcourt Williams, Manchester Corporation Electricity Department, Dickinson Square, Manchester, or from any member of the general committee.

Manchester Electro-harmonic Society

The Manchester Electro-Harmonic Society is holding a series of monthly smoking concerts throughout the winter session commencing on October 20th. The headquarters of the Society will be the Waldorf Hotel, Cooper Street, Manchester. A Ladies' Evening will be held on January 27th.

The Young Engineer

In his presidential address to the Institution of Engineers and Shipbuilders in Scotland on October 3rd, Prof. J. D. Cormack pointed out that one outstanding feature of the present century had been the growth of research, not only in sciences closely in touch with engineering, such as physics, chemistry, metallurgy, and geology, but also in biology, which might in the future bear a closer relationship to it. The number of research workers in science had increased from eight to ten times during the last twenty years, and in some branches the rate of supersession of apparatus was sufficient to alarm any economist. The boundary between physics and chemistry was gradually being smoothed. Much had been said and written about modern youth, mostly about his failings and incapabilities. As one who had been continuously in touch with young engineers, the president expressed the opinion that they were not, in general, inferior nowadays either in knowledge, ability, capacity, grit, or physique.

I.E.E. Informal Meetings

The first informal meeting of the Institution of Electrical Engineers for the 1933-34 session will be held on October 30th, when Mr. P. V. Hunter, the president, will open a discussion on "Can Underground Cables be used Economically for 11,000-V Distribution?" At the subsequent meetings the following discussions will take place:—November 13th: "Power Factor Improvement," opened by Mr. E. L. Fairclough. November 27th: "Hot Cathode Lamps," opened by Mr. J. W. Ryde. December 11th: "Luminous Gas Signs," opened by Mr. J. Eck. December 18th: "Modern Developments in X-ray Work," opened by Dr. G. T. Loughborough; January 8th: "Speed Regulation of Small A.C. Motors," opened by Mr. D. B. Hoseason. The meetings will begin at 7 p.m.

Cable Fault Localisation

We have received the following letter on going to press:—

We note, with regret, that the reference to a paper by Urmston in the *Journal* of the Institution of Electrical Engineers (Vol. 69, p. 983) was omitted from our article on "Cable Fault Localisation." Any article on this subject is not complete without some reference to his pioneer work.

Details of two further actual examples on which the capacity fault localiser was used may be of interest to your readers: The first was on a length of 5,214 ft. of 0.05-sq. in., 3,000 V, three-core cable. On test it was found that all cores were severed and all had a resistance to earth of less than 20 ohms, except the blue phase from one end, which had an insulation resistance of 0.5 megohm. As the capacity per unit length of this cable was not known, a test was taken on the next section of similar cable. This gave the following capacities for a length of 5,456 ft.: red phase, 0.4381 mF.; white phase, 0.4366 mF; blue phase, 0.4371 mF, and mean, 0.4373 mF. The capacity of the blue core on the faulty section was 0.1852 mF. The calculated distance to the fault was $5456 \times 0.1852 / .04373 = 2,320$ ft., and the fault was actually found at 2,337 ft. from this end, giving an error of 17 ft.

In the other case the fault was on a length of 15,270 ft. of 22,000-V three-core cable terminating at a pole line. The red and blue phases were severed and the white core continuous. An insulation test gave red infinity, white 50 megohms, and blue 1.2 megohms. The capacities from the sub-station end were: red 0.059 mF, white 0.7467 mF. From the pole end red gave 0.6827 mF. The distance to the fault from the sub-station end, based on the capacity of the white phase, was $15270 \times 0.059 / 0.746 = 1.207$ ft.; and based on the sum of the capacities of the red phase the distance was $15270 \times 0.059 / 0.059 \times 0.6827 = 1,213$ ft. The actual fault was found at 1,211 ft. from this end.—W. L. Beck, A.M.I.E.E., and G. F. Shotter, A.M.I.E.E.

The Eiffel Tower Clock

A synchronous a.c. motor rated at 2 W and weighing only 300 grammes is used for operating what is said to be the largest clock in the world—that recently erected on the Eiffel Tower—which has two 20-metre faces in accordance with the old rule that the diameter of a dial should be one-tenth of its height above ground. The reason for the small amount of power needed is that the "hands" consist of electric lamps (as described in our issue of August 25th, page 244) and the function of the motor is to control the timing of their illumination. The motor was manufactured in England by the British Sangamo Co., Ltd. L'Etablissements Henri Lepaute, of Paris, designed and manufactured the clock, which called for the provision of 17 km. of cable and about 6,000 lamps.

Visit to Power Station

A party of 100 members of the Yorkshire branch of the Institution of Mechanical Engineers paid a visit of inspection, on September 28th, to the Valley Road generating station of Bradford Corporation Electricity Department. The visitors were welcomed by Mr. T. Roles, city electrical engineer and manager, and were afterwards entertained to tea at the Town Hall by the Lord Mayor (Ald. J. W. Longley). In the evening the members attended a lecture by Mr. L. W. Schuster, chief engineer to the British Engine, Boiler and Electrical Insurance Co., Ltd. During the works visit special interest was taken in the high-pressure boiler and turbine plant at the Bradford power station.

High-frequency Electric Welding

According to K. J. Schenfer, says *Elektrotechnik und Maschinenbau*, better results are obtained in electric arc welding by using a.c. of higher than normal supply frequency. One method of obtaining triple-frequency current consists in using a four-leg transformer with a three-phase, star-connected primary winding on the first three legs and, on the fourth, a secondary connected to the welding electrodes. The transformer iron being run at high saturation, the primary takes a higher magnetising current than usual and the secondary current contains pronounced third harmonics.

Alternatively, triple-frequency current may be obtained by using a highly saturated three-phase transformer with a star-connected primary and a delta-connected secondary, the welding electrodes being connected between the adjacent ends of two of the secondary phases, *i.e.*, in series with the delta. A modification of this arrangement uses two three-phase transformers; the delta primary of one transformer is connected to the star secondary of the other, and triple-frequency welding current is taken from the neutral points of the two star-connected secondaries.

Teaching Electricity

The series of lectures in electrical house craft for teachers arranged by the Electrical Association for Women has proved so popular that the lists have had to be closed with the first ninety applications. The first lecture of the course was given last night when Miss Bright, of the L.C.C., opened the meeting.

Appointments Vacant

Lady demonstrator and assistant-in-charge for the Peterborough showrooms.

Mechanical electrical engineer for the Royal Aircraft Establishment, South Farnborough.

Lady showroom assistant and demonstrator, and junior lady showroom assistant for Stockport Electricity Department.

(See our classified advertisements.)

Makers' Names Wanted

Latona radiator.
Kernshaw arc lamp.
Trane heater.
Robur vacuum cleaner.
Essco electric iron.
W.L.C. bowl fire.
Sunray shop window reflectors.
Victor dimming switch.

Our Personal Column

Electrical men are invited to enable us to keep readers of the "Electrical Review" posted concerning their movements

The E.D.A. Council.—In our last issue (page 423) we published portraits of fourteen of the members of the new Council of the British Electrical Development Association. The names are now to hand of the two representatives of the Incorporated Association of Electric Power Companies; they are Capt. J. M. Donaldson and Brig.-Gen. R. F. Legge. These additions complete the total of sixteen representatives of members of the Association. It will be remembered that the Council, as thus formed, has power to co-opt not more than three members without voting power; the Local Area Committees also have power to nominate representatives, and the names of these are given below in our list of the Council as it stands to-day:—

Appointed by the *Central Electricity Board*.—Messrs. W. McGill, C. G. Morley New, R. W. L. Phillips, R. P. Sloan, C. D. Taite and W. C. P. Tapper.

I.M.E.A.—Messrs. E. J. Jennings, H. C. Lamb, A. E. McKenzie, E. Morgan, and P. J. Robinson.

Incorporated Association of Electric Power Companies.—Captain J. M. Donaldson and Brig.-Gen. R. F. Legge.

Provincial Electric Supply Association.—Mr. A. J. Fippard.

London Electricity Supply Association.—Mr. R. S. Downe.

Joint Electricity Authorities who are Members of the Association (jointly).—Ald. B. J. Samels.

Representing Area Committees.—Messrs. W. F. T. Pinkney, T. Roles, C. D. Taite, F. Nicholls, A. Nichols Moore, A. J. Newman, and Councillor E. Walker.

Mr. W. B. Williams, the immediate past-president of the Electrical Contractors' Association, was unanimously elected a fellow of the E.C.A. at the last meeting of the Council.

Mr. P. W. Willans, M.A., M.I.E.E., was married at Wrexham Parish Church on September 23rd to Miss Marion Jane Stubbings.

Dr. J. Firminger, B.A., D.Sc., Ph.D., who was for many years lecturer on physics at Rochester and Michigan Universities, especially light and heat, and who has for the past ten years devoted all his time to lighting research work in this country, is to co-operate with the Benjamin Lighting Engineering Service.

Mr. I. V. Robinson, M.I.MechE., A.M.I.C.E., of the staff of the British Electrical & Allied Manufacturers' Association, left for Australia on September 29th to submit to the Australian Tariff Board the case of the British electrical manufacturers for a reduction of the preferential tariff on certain electrical items.

Mr. G. F. Craven, director of the Park Royal Coach Works, Ltd., has been appointed manager of the Halifax Corporation tramways, in succession to the late Mr. Walter Young. There were 117 applications for the post. Mr. Craven, who is a native of Ripon, was for seven years with the Metropolitan-Vickers Electrical Co., Ltd., in charge of the tramway section, and he has been a director of Great Western Motors, Ltd., Reading. He is a member of the Institutions of Electrical, Mechanical and Civil Engineers.

Mr. C. Nelson Hefford, M.Sc., M.I.E.E., city electrical engineer, Leeds, was elected president of the Leeds Electrical Club for the year 1933-34 at the annual meeting held on September 13th.

Mr. W. K. Fleming, the author of the article on "The Built-in Electric Fire" printed on page 449 of this issue, is burgh electrical engineer of Rothesay

Mr. J. Craven has been elected chairman, **Mr. E. G. Sellers** hon. secretary, and **Mr. E. Dunn** hon. treasurer.

Mr. R. Cadwell has been appointed by the Southport Tramways Committee as traffic superintendent in succession to the late Mr. A. E. Clayton.

Mr. A. S. Radford, D.I.C., B.Sc., of the Marconiphone Technical Department, was married on September 24th in Stockholm to Miss Anna-Greta Holmqvist. Mr. and Mrs. Radford returned to London by air on September 26th.

Mr. C. B. Burnett, of the Publicity Department of the British Thomson-Houston Co., Ltd., Rugby, has left to take up an appointment with the Ripley Preston Co., Ltd., advertising consultants, Birmingham.

Mr. N. A. Collard has been appointed assistant general manager of the Brush Electrical Engineering Co., Ltd. Prior to the war, Mr. Collard had experience with Messrs. Clarke, Chapman & Co., Ltd., and Sir W. G. Armstrong Whitworth & Co., Ltd., on Tyneside. Subsequently he was associated with the Sales Department of the Metropolitan-Vickers Electrical Co., Ltd., and the Stirling Boiler Co., Ltd. He joined the sales staff of the Brush Company in January, 1931.

[*Howard Coster*

Mr. N. A. Collard

Barnstaple Staff Salaries.—Having considered reports submitted on the question of salaries in the electricity supply industry, with details of scales operative in relation thereto, the Lighting Committee recommended to Barnstaple Town Council, at a meeting of the latter on September 25th, that the salaries of the electrical staff should be as follows: Borough electrical engineer, £620 per annum, the Council to retain all premiums in respect of articled pupils; assistant electrical engineer, £320; shift charge engineer, £230 10s.; collector, £240; and clerk, £182. The Lighting Committee's recommendations were referred to the Finance Committee.

Mrs. C. C. Paterson, whose floodlighted garden is dealt with on page 457, is here seen in her kitchen, which is naturally "all-electric"

Vacancies which have occurred in the Blackburn Corporation electricity staff owing to the death of the shift engineer and through two officials accepting higher positions elsewhere, together with the rapid development of the undertaking since **Mr. W. A. Royle,** the electrical engineer, took charge, has led to a reorganisation. The position of deputy electrical engineer, which has been vacant for three years, is being filled by the appointment of **Mr. R. H. Harral,** mains superintendent, at a salary of £556 per annum, rising to £641 in two years. The remaining vacancies are being filled by advancing members of the present staff. **Mr. J. P. Langstaffe,** sub-station engineer, becomes mains superintendent, and five other officials are promoted. The positions of consumers' engineer and draughtsman are being advertised.

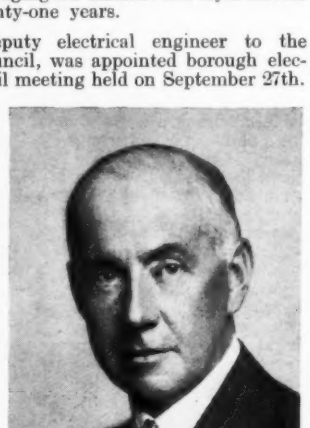
Mr. R. H. Harral

Mr. R. H. Harral has had considerable experience in the industry. He started in the office at Blackburn under Mr. P. P. Wheelwright, and subsequently entered the

works as a pupil. In 1915 he went to Rochdale; two years later he had experience at Darlington; and in 1918 he joined the Yorkshire Electric Power Co. at Leeds. He remained there until 1929, when he returned to Blackburn and started at the Whitebirk station as mains superintendent. Mr. Harral is an associate of the Institution of Electrical Engineers.

Mr. L. E. Harvey, late tramway manager at Ilford, who has received an appointment with the London Passenger Transport Board, has been presented with an address by Ilford Corporation, acknowledging his efficient and loyal service for a period of nearly twenty-one years.

Mr. A. F. Harmer, deputy electrical engineer to the Hammersmith Borough Council, was appointed borough electrical engineer at the Council meeting held on September 27th. After his education at the City of London School Mr. Harmer was with Messrs. J. G. Statter & Co., then of Westminster and Millwall. He subsequently proceeded to Battersea Polytechnic, and began his electricity works experience with the Islington Borough Council undertaking. From 1900 to 1930 he was with the Metropolitan Electric Supply Co., under Messrs. Todd. Highfield, Markby and Richardson. Next he was assistant to Mr. Purse at the London and Home Counties Joint Electricity Authority. He took up the appointment of deputy borough electrical engineer at Hammersmith in 1931, and has now, as already stated, become head of that undertaking. Mr. Harmer is a member of the I.E.E., which he joined in 1911. For the first six years he served on the Informal Meetings Committee, and has read several papers before this section. He was a member of the I.E.E. Council for three years, and has served on several committees. He is also a member of the Dynamicables and of the Batti-Wallahs' Society. His achievements in electrical invention include the ring main controller for e.h.p. distribution, gear which has been taken up under various forms by a number of well-known switchgear makers he is also the patentee of a successful e.h.p. switch-fuse.



[*Elliott & Fry*
Mr. A. F. Harmer

Miss V. Brice informs us that she has resigned her position as chief demonstrator with Beckenham Electricity Department.

Professor J. Hollingworth, M.A., D.Sc., M.I.E.E., was elected president of the Athenæum Electrical Club, Manchester, at the first annual meeting held on September 21st.

Mr. K. S. Murray has signified his intention to resign his positions as chairman and managing director of the British Oxygen Co., Ltd., on December 31st next. Mr. Murray has contemplated this step for some years, but has delayed taking it until the reorganisation of the business, necessitated by amalgamations, had been completed. Subject to the approval of the shareholders, he has been appointed honorary governor for life, in recognition of his services to the company for nearly fifty years, and has accepted the position of consulting engineer to the company.

Mr. D. J. Barnes, district manager of Post Office telephones at Nottingham, is about to retire under the age limit. He was previously at York, and has spent the whole of his business life in the telephone service.

Dr. H. K. Graham Hodgson, hon. radiologist to King's College Hospital, has been appointed physician-in-charge of the new department of X-ray diagnosis at Middlesex Hospital, for which Mr. W. H. Collins has given £25,000.

Obituary

Mr. F. L. Kirby, whose death occurred recently in Sydney, N.S.W., was Australian sales manager and director of Siemens (Aust.), Pty., Ltd. Mr. Kirby was born in Australia in 1899 and was educated at the University of Sydney. He joined the Australian subsidiary of Messrs. Siemens Bros. & Co., Ltd., after experience in colliery and power work.

Mr. T. H. Leak.—We regret to learn of the death of Mr. T. H. Leak, of the General Electric Co., Ltd., which occurred on October 3rd, at the age of 50, after an illness lasting two months. Mr. Leak had been in the Industrial Heating Department of the G.E.C. since 1924, being in charge of baking oven development, and he was widely known in the baking trade both in London and the Provinces. He had contributed articles to the ELECTRICAL REVIEW on electric ovens.

Mr. W. Frain.—The death occurred on September 20th, at Dundee, of Mr. William Frain, at the age of sixty-seven. Mr. Frain, who was a native of Edinburgh, had been associated with the electrical industry for nearly forty years and was for many years district manager of the Edison Swan organisation, giving up active control in 1923. He was a member of the Institution of Electrical Engineers and took an active part in the formation of the Dundee Sub-Centre of the Institution, of which, after holding for some years the position of hon. secretary, he was elected vice-chairman. He was prominent in the municipal affairs of Dundee, and for many years was a member of the Electricity Committee.

Will.—Mr. C. H. Allin, late director of Posts & Telegraphs, Federated Malay States, left £8,078 (net personalty £7,961).

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

I. Loffet & Co., Ltd.—Private company. Registered September 23rd. Capital, £500 in £1 shares. Objects: To carry on the business of electricians, mechanical engineers, suppliers of electricity for light, heat, motive power or otherwise, wireless engineers, &c. The directors are: Ivan O. A. J. Loffet, 85, Dale Street, Milnrow, near Rochdale; and James W. Whitehead, 17, Brook Terrace, Newhey, near Rochdale.—Solicitors: Jackson & Co., Rochdale.

Turbo Transmission, Ltd.—Private company. Registered September 23rd. Capital, £2,000 in 2s. shares. Objects: To acquire any interests in any patents, *brevets d'invention*, licences and concessions; to carry on the business of mechanical, electrical and general engineers, manufacturers of and dealers in machinery, boiler makers, &c. The subscribers (each with one share) are: W. H. Gray, Southampton, and J. Robson, Woodbury, Caterham Valley. Solicitors: Last, Riches & Fitton, 18, Bolton Street, W.

Wireless Maintenance, Ltd.—Private company. Registered September 21st. Capital, £150 in 10s. shares. Objects: To carry on business as radio and television engineers and contractors, electrical engineers, electricians, &c. The directors are: C. A. Howard and Mrs. Beatrice M. Howard, both of 383, Watford Way, Hendon, N.W.4. Registered office: 383, Watford Way, Hendon, N.W.4.

Crystal Light Co., Ltd.—Private company. Registered September 26th. Capital, £2,000 in 1,800 10 per cent. cumulative preference shares of £1 and 4,000 ordinary shares of 1s. each. Objects: To acquire the business of vendors, distributors and agents for electrical goods heretofore carried on by the Crystal Light Co. at Scarborough, Yorks. The directors are: R. Colin, 22, Victoria Road, Scarborough (director of R. Colin & Co., Ltd., and Vause & Co., Ltd.); R. Marshall, Westhaugh, Throxenby Lane, Newby, near Scarborough (director of R. Colin & Co., Ltd., and Vause & Co., Ltd.); and F. Heptonstall, 43, The Avenue, Castle Park, Whitby (director of Vause & Co., Ltd.).

Ogmore & Garw Radio, Ltd.—Private company. Registered September 26th. Capital, £1,000 in £1 shares. Objects: To carry on the business of constructors and maintainers of wireless signal stations, &c. The permanent directors are: J. L. Davies (managing director), "Woodlands," Caerau; W. T. Lewis, "Brynglas," Maesteg, and G. E. Howells, 17, Turbervill Street, Maesteg. Solicitors: A. King-Davies, Lloyds Bank Chambers, Maesteg.

Perkins & Spencer, Ltd.—Private company. Registered September 23rd. Capital, £1,000 in £1 shares. Objects: To carry on the business of electricians, general electrical contractors and engineers, &c. The directors are: J. G. Perkins, 2, Tennyson Street, Leicester, electrical engineer, and R. C. Spencer, 83, St. Peter's Road, Leicester, electrical engineer. Secretary: T. G. Rimington, 8, Horsefair Street, Leicester.

Wholesale Radio Supplies, Ltd.—Private company. Registered September 28th. Capital, £100 in £1 shares. Objects: To carry on the business of wholesale and retail merchants, manufacturers, importers and exporters of all kinds of gramophones, musical instruments, and wireless, radio, television and electrical apparatus, &c. The permanent directors are: M. Holzman, 245, Chamberlayne Road, Willesden, N.W.10; and H. Defries, 186, Willesden Lane, N.W.2. Solicitors: H. Bueno de Mesquita, 47, Albemarle Street, Piccadilly, W.1.

Reasonable Radio, Ltd.—Private company. Registered September 30th. Capital, £600 in £1 shares. Objects: To acquire the business of radio dealers carried on by H. A. Harris and D. Bird at 146, High Street, Hornchurch, and 92, High Street, Brentwood, Essex. The permanent directors are: H. A. Harris (managing director), Seymour, Abbs Cross Lane, Hornchurch, Essex; D. Bird, 22, Church Road, Barking; and P. C. Harrop, 1, Lytton Road, Gidea Park, Essex. Secretary: Arthur B. Townley. Registered office: 146, High Street, Hornchurch, Essex.

Wiring, Ltd.—Private company. Registered September 29th. Capital, £2,500 in 2,000 7½ per cent. cumulative preference shares of £1 and 10,000 ordinary shares of 1s. each. Objects: To acquire the whole or any part of the undertaking of H. Friis

(London), Ltd., and to carry on the business of electrical engineers and contractors, &c. The subscribers are: Chas. J. Winterson, 107, Falcon Road, Clapham Junction, S.W.11, and two others. A. E. Bloom signs documents as director. Registered office: 222-226, Ulster Chambers, 168, Regent Street, W.1.

Returns of Electrical Companies

F. R. Horwood & Company, Ltd.—Issue on June 28th, 1933, of debentures to secure £100 and a bonus of 5 per cent., part of a series already registered.

Mackett & Keik, Ltd.—Mortgage debenture, dated August 9th, 1933, to secure £200, charged on the company's undertaking and property, present and future, including uncalled capital. Holder: H. F. A. Kinder, Byways, Baldstow, St. Leonards-on-Sea.

Hume Atkins & Co., Ltd.—Particulars filed of debentures not exceeding £3,000, authorised August 16th, 1933, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £2,800.

E. Dyne & Co., Ltd.—Particulars filed of £5,000 debentures, authorised September 19th, 1933, charged on the company's undertaking and property, present and future, including uncalled capital (if any), the amount of the present issue being £4,300.

Ipswich Wireless Co., Ltd.—Capital, £1,500 in £1 shares. Return dated June 8th, 1933. All shares taken up. £1,500 paid. Mortgages and charges: £4,500.

J. Browett Lindley (1931), Ltd.—Capital, £100 in £1 shares. Return dated July 26th, 1933. All shares taken up. £100 paid. Mortgages and charges, nil.

Northwood Electric Light & Power Co., Ltd.—Capital, £60,000 in 15,000 preference and 45,000 ordinary shares of £1. Return dated June 15th, 1933. 6,880 preference and 45,000 ordinary shares taken up. £47,655 paid on 6,880 preference and 40,775 ordinary shares, £4,225 considered as paid on 4,225 ordinary shares. Mortgages and charges: £30,242 12s. 9d.

British Electric Meters, Ltd.—Capital, £50,000 in £1 shares. Return dated July 7th, 1933. 25,000 shares taken up. £17,650 paid, £7,350 considered as paid. Mortgages and charges, nil.

East Anglian Electric Supply Co., Ltd.—Capital, £450,000 in 40,000 preference and 410,000 ordinary shares of £1. Return dated May 3rd, 1933. 2,581 preference and 310,000 ordinary shares taken up. £273,419 paid on 122 preference and 273,297 ordinary shares, £39,162 considered as paid on 2,450 preference and 36,703 ordinary shares. Mortgages and charges, nil.

Neon Moving Messages, Ltd.—The nominal capital has been increased by the addition of £1,500 in £1 ordinary shares beyond the registered capital of £1,500.

Thomas A. Rose & Son, Ltd.—S. G. Morris, 6, Wardrobe Place, E.C.4, ceased to act as receiver and manager on September 25th, 1933.

William Geipel, Ltd.—Capital, £25,150 in 25,000 preference, 100 "A" ordinary, and 50 "B" ordinary shares of £1. Return dated May 19th, 1933. All shares taken up. £23,650 paid. shares taken up. £400 paid. Mortgages and charges, nil.

Sheringham and District Electricity Supply Co., Ltd.—Capital, £25,000 in £1 shares. Return dated May 8th, 1933. 400 shares taken up. £400 paid. Mortgages and charges, nil.

Electric Cables, Ltd.—Capital, £2,000 in £1 shares. Return dated December 31st, 1932 (filed May 10th, 1933). 1,000 shares taken up. £1,000 paid. Mortgages and charges, nil.

E. Goldston, Ltd.—Capital, £2,500 in 2,250 preferred ordinary shares of £1 and 50,000 founders' shares of 1s. each. Return dated July 22nd, 1932 (filed March 29th, 1933). 1,282 preferred ordinary and 5,000 founders' shares taken up. £200 paid on 200 preferred ordinary shares. £1,332 considered as paid on 1,082 preferred ordinary and 5,000 founders' shares. Mortgages and charges, nil.

Westminster Tool & Electric Co., Ltd.—Capital, £8,000 in 7,900 ordinary and 100 founders' shares of £1. Return dated May 19th, 1933. 7,350 ordinary and 100 founders' shares taken up. £1,560 paid. £5,890 considered as paid. Mortgages and charges, £9,000.

Radio Relay Services (Shoreham-by-Sea), Ltd.—Debenture dated September 7th, 1933, to secure £2,000 charged on the company's property, present and future, including uncalled capital. Holder: Mrs. A. E. Barratt, 136, Beach Road, Shoreham-by-Sea, Sussex.

City Notes

Murex, Ltd., reports a trading profit for the year ended June 30th last of £69,583, as compared with £54,526 in the preceding year, and a net balance of £68,677, against £69,206. To this is added £34,204 brought in, and after providing for depreciation, &c., it is proposed to pay a final ordinary dividend of 20 per cent., making 30 per cent. for the year (against 35 per cent.), leaving a balance of £44,150 to be carried forward. A sum of £183,531 from reserve has been applied to the elimination from the consolidated balance sheet of goodwill, premiums paid for shares in subsidiary companies, patent rights, &c. This reduces the figure for the value of shares in subsidiary companies to £70,679, and that for patent rights and goodwill to £1. It is proposed to increase the capital to £275,000 by the creation of 50,000 new ordinary shares of 10s. each and these, with 26,966 shares (balance of unissued ordinary capital), will be offered to present shareholders at 42s. 6d. per share. The necessary resolutions for the increase of capital were to be submitted to the annual meeting held yesterday.

Joseph Lucas, Ltd., report gross profits for the year to August 7th last of £250,427, as compared with £229,150 in the preceding year. It is proposed to pay a final ordinary dividend of 10 per cent. making 15 per cent. for the year (same), and a bonus of 10 per cent. (against 5 per cent.). After allocating £50,000 to reserve and £10,000 to the workpeople's old-age fund, £66,277 is carried forward. The report states that a large portion of the company's ordinary capital has been issued from time to time at substantial premiums. With the object of bringing the issued capital more into accord with the assets and capital employed, it is now proposed to increase the ordinary capital by a share-for-share distribution out of reserve.

The British Columbia Power Corporation reports a net revenue for the year ended June 30th last of $4,036,266, as compared with $4,519,838 in the previous year. After meeting bond interest, discount written off, preference dividends, and dividends on class "A" shares, there is a deficit for the year of $462,852, against a surplus of $9,339. The report states that adverse conditions prevailed throughout the year, but there are indications that the Corporation may reasonably anticipate improved business conditions.

The imposing nature of the new showroom extensions of Messrs. Berry's Electric, Ltd. (see page 485), can be gauged from this picture

Companies Struck off the Register.—The names of the following companies have been struck off the Register and they are thereby dissolved:—Celynin Electric Light Co., Ltd.; Electrical Manufacturers' Co. of Great Britain, Ltd.; Luth and Rosen Electric Co., Ltd.; Robin Electric Lamp Co., Ltd.

Edgar Allen & Co., Ltd., announce that payment of the dividend on the cumulative preference shares for the half-year ended September 30th has been deferred. The directors state that it is still necessary to conserve resources in view of the continued trade uncertainty.

The Marconi International Marine Communication Co., Ltd., has declared an interim dividend of 2½ per cent. (against 5 per cent. a year ago).

The Salisbury Electric Light & Supply Co., Ltd., has declared an interim ordinary dividend of 4 per cent., tax free (same).

The International Telephone & Telegraph Corporation announces that no dividend action was taken by the directors at the meeting on September 21st.

The Bognor Gas & Electricity Co. reports that the additional ordinary "A" stock which was offered for sale by tender on September 18th was oversubscribed.

Stocks and Shares

Tuesday Evening.

THE most cheerful event of the present week has been the publication of national revenue and expenditure figures, showing that the nation is rapidly getting into its stride towards financial prosperity. The indications which are held to point to a possible reduction of income tax in the next Budget emphasise the effect of tariff impositions as well as that of cheap money. There seems to be something anomalous in the fact that, growing side by side, on a twin root, are abundance of capital with low interest rates, together with expansion of industry and a call for cash to be employed in avenues of trade. The anomaly persists, however. The British Government has this week completed a conversion scheme at the lowest basis of interest yet established for such an operation. On the other hand, shares in the best-known industrial and trading companies have been steadily rising, because of the increase in business. The situation in America remains one of extreme uncertainty.

The Decline in Yield

The opinion has been expressed here on recent occasions that prices of shares in the electricity supply companies, particularly those of the Metropolis, are not likely to command higher figures by reason of the very modest yields that they afford. This opinion is being confuted by the incessant accumulation of investment money which, at a loss to discover first-rate securities offering 4 per cent., turns to anything in the highest rank of industrial ordinary shares to provide what is now regarded as being the necessary rate. The times have long passed when 5 per cent. was considered to be a reasonable return to expect. To-day, capital is content with 4 per cent. from front-rank security, and it will be observed, from reference to the price-lists, that the ordinary shares in the London electricity supply companies are approaching the level of a 4 per cent. return.

South Londons are up to 33s. 6d., Kensingtons to 34s., County of London to 57s. 6d., Metropolitans to 52s. 6d. The last two, it will be noticed, pay less than 4 per cent. on the

money. The others yield but a trifle over that rate. Even when the excursion is made into provincial shares, the same provoking (to the prospective purchaser) tendency is observable. Bournemouth & Poole have risen to £4, North-Eastern Electric ordinary to 33s., the returns being well under 4 per cent. in both cases. Midland Counties, Northamptons, and Midland Electrics are all higher. Electric Supply Corporations, after their very vivid rise, have reacted $\frac{1}{16}$, and at 76s. 3d. the return is nearly 2⅜ per cent., though this is nothing to go by, the recent buying having been based on the expectation of a bonus being declared in the fairly near future. Llanelly Electrics are a good market at 24s.

When it comes to getting the offer of debenture stocks, the difficulties are still further increased by reason of the tenacity with which holders cling to their stock. It is well that the new issue season should be started, for there is plenty of money awaiting investment, and a few new stocks and shares of sound character would make welcome additions to the market in its present condition.

Electrical Authorities

London & Home Counties 4½ per cent. stock has put on 3 points, advancing to 110. Central Electricity 3½ per cent. new scrip is something of a feature. For weeks past the quotation has been standing at a discount on the issue price of 93½. The underwriters' stock took a long time to get placed, but directly the last block had disappeared the price jumped to a premium. At 93¾, the stock is 1¼ higher on the week. In the London Transport Group, the "C" stock rose 2 to 86, receding later to 85, upon what seemed to be taking of profits.

Cables and Wireless

How to account for the dryness of the market in Cables & Wireless stocks is puzzling a good many holders of the securities, because investment appetite, sharply edged as it is today, refuses to pay serious attention to what looks to be a promising lock-up in the 5½ per cent. preference stock. From the drop of 4 points that took place last week, there has been a moderate rally; the "A" ordinary stock is also harder, at 27½. The traffic return for August was disappointing, it is true, but the figures of a year ago, against which those of last month compared poorly, were swollen by the extra business resulting from the War Loan conversion, and one or two other non-recurring factors. The chairman stated at the last meeting that no further dividend payment could be expected this year, and perhaps the speculative investor thinks that next March is too far off to make it worth his while to take an interest yet in the stock. Globe Telegraph & Trust ordinary are 5s. lower in sympathy with the heaviness of Cables & Wireless. Great Northern Telegraphs recovered a further 30s. to 31½ upon the understanding, mentioned here last week, that the Paris selling tap had been turned off. Marconi Marines are flat at 28s. 9d., on the reduction of the interim dividend to 2½ per cent., being half the rate distributed a year ago. The directors are pursuing a cautious financial policy.

Dollar Stocks

American Telephone & Telegraph is 10 points down at 122¼. Internationals weakened to 14. President Roosevelt's campaign is rightly considered as a movement of pure Socialism —good for the workers but not so favourable to companies and corporations. American and Canadian utility stocks are irregular. Amongst other foreign issues, Brazilian Tractions show a gain at 14, while Mexican Light & Power bonds at 45 are 5 points down. Western Union Telegraphs are flat at 55½.

Manufacturing and Equipment

Associated Electrical Industries ordinary shares have gone back to 20s., in sympathy with the dullness that has taken place in the shares of most companies connected in any way with America. The shares are held, according to general report, fairly considerably by American interests. General Electrics, at 45s., have recovered their slight decline of a week ago. Henleys are a good market at $6\frac{7}{16}$, and Callenders have risen to $3\frac{7}{16}$, the latter company's preference shares also being better at 31s. 3d. The last-named have risen 2s. 6d. in the past fortnight. Ferranti preference have further strengthened to 27s. Crompton Parkinson 8 per cent. preference at 30s. are 9d. down. Telephone Rentals gained a few pence at 7s. 7½d. Something of a feature in the home industrial list is a general recovery in iron and steel shares. For this improvement the last-issue Board of Trade returns, taken in conjunction with the home railway traffic increases, are held responsible. Babcock & Wilcox at 35s. 9d. are a florin better, buyers coming forward to take the shares on a decline brought about the fears concerning the dividend.

Miscellaneous Matters

The principal excitement of the week came in the rubber share market, where a rise to 4¼d. a lb. in the price of the produce led to resuscitation of activity and a repetition of that enthusiasm which has not been seen for a long time past in the market for rubber shares. The best prices were not held, and the boomlet of Monday in this week was succeeded by a sharp reaction upon a statement that the Colonies were not unanimous in regard to the subject of restriction.

Amongst other movements may be mentioned a further rise to 20s. 9d., in British Power & Light shares. Atlas firmed up to 9s. Philips Incandescent Lamps remain dull at 46s. 3d. Telegraph Condenser ordinary hold their previous price at 20s. 6d.; the 6 per cent. preference at 21s. 9d. are rather harder on the week.

Share List of Electrical Companies

Home Electricity Companies.

	Nom.	Approx. Dividend. 1931.	1932.	Price, Oct. 3.	Rise or Fall.	Yield. p.c. £ s. d.
Bournemouth and Poole	1	15	15	80/-	+½	3 15 0
Brompton Ordinary	1	8½	7	33/-	—	4 4 10
Charing Cross Ordinary	1	8½	7	34/6	—	4 1 2
Chelsea	1	8¾	7	32/6	—	4 6 2
City of London	1	10	10	33/9	—	4 3 0
Clyde Valley	1	7	7	38/3	—	3 13 8
County of London	1	10½	10½	57/6	+2/6	3 13 0
Edmundson's 7% Pref.	1	7	7	33/-	—	4 4 10
Elec. Dis. Yorkshire	1	9	9	48/9	—	3 13 9
Elec. Supply Corporation	1	11	11	76/3	—$\frac{1}{16}$	2 17 8
Kensington Ordinary	1	8	7	34/-	+6d.	4 2 4
Lancs Light and Power	1	7	7	36/3xd.	—	3 17 2
London Electric	1	9	7	33/-	—	4 4 10
Metropolitan	1	10	10	52/6	+$\frac{1}{16}$	3 16 0
Midland Counties	1	7	7	37/6	+$\frac{1}{16}$	3 14 8
Mid. Elec. Power	1	8	8	42/6	+$\frac{1}{16}$	3 15 3
North Eastern Electric Ordinary	1	6	6	33/-	+6d.	3 12 10
Do. 7% Pref.	1	7	7	33/-	—	4 4 10
Northampton	1	10	10	53/9	+6d.	3 14 6
Notting Hill 6% Pref.	10	6	6	13½	—	4 12 4
North Met. Elec. 6% Pref.	1	6	6	30/-	—	4 0 0
St. James' and Pall Mall	1	8	7	34/-	—	4 2 4
Scottish Power	1	8	8	40/-	—	4 0 0
South London	1	8½	7	33/6	+6d.	4 3 7
Westminster Ordinary	1	8¾	7	34/-	—	4 2 4
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	21/3xd.	—	7 1 2
Yorkshire Elec.	1	8	8	47/6	—	3 7 6

Public Boards.

Central Electricity, 1950–70	Stock	5	5	112	—	4 9 1
Do. 1951–73	„	4½	4½	109	—	4 2 7
Do. 1963–93	„	—	3½	93½	+1½	3 14 8
London & Home Counties, 1955–75	„	4½	4½	110	+3	4 1 10
London Passenger Transport, A	„	—	4½	116	—	3 17 7
Do. do. B	„	—	5	119	—	4 4 0
Do. do. C	„	—	—	85	+1	—

Telegraph and Telephones.

American Tel. & Tel.	$100	9	9	122½xd	—10	7 7 0
Anglo-Am. Tel. Pref.	Stock	6	6	112	—	5 7 7
Do. Def.	„	1½	1½	28½	+½	5 5 3
Cables & Wireless 5½% Pref.	„	2¾	2¾	78½	+1	3 10 0
Do. A 7½% Ord.	„	Nil	Nil	27½	+1	—
Do. B Ord.	„	Nil	Nil	13	—	—
Globe Tel. and T. Ord.	10	Nil	2½	11½	—½	2 5 0
Do. do. Pref.	10	6	6	12½	—	4 16 0
Great Northern Tel.	10	20	20	31½	+1½	6 7 0
Marconi-Marine	1	10	7½	28/9	—½	5 4 5
Oriental Telephone Ord.	1	12	12	2½	—	*4 3 6

Home and Foreign Trams, Etc.

Anglo-Arg. Trams First Pref.	5	Nil	Nil	4/6	—	—
Do. do. 2nd Pref.	5	Nil	Nil	3/6	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	7½	—	—
British Electric Traction Df. Ord.	„	5	5	500	—	—
Do. do. Pref. Ord.	„	8	8	144½	+2	5 10 9
Brazil Traction	100	—	—	14	+⅛	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	102	—	4 18 0
Mexico Trams, 5% Bonds	—	5	5	27½	—	18 3 8
Mexican Light Common	100	Nil	Nil	7½	—4	—
Do. 7% Pref.	100	7	7	15	—	—
Do. 1st Bonds	—	5	5	45	—5	11 2 2
Victoria Falls Ord.	1	15	20	105	+½	3 18 2
Yorkshire (West Riding)	1	Nil	Nil	14/6	—	—

Manufacturing Companies.

Assoc. Elec. Ord.	1	4	4	20/-	—1/-	4 0 0
Do. Pref.	1	8	8	30/9	—	5 4 2
Babcock & Wilcox	1	14	9	35/9	+2/-	5 0 8
British Aluminium Ord.	1	5	5	28/9	—	3 9 7
British Insulated Ord.	1	15	15	71/3xd.	—	4 2 4
Brush Ord.	Stock	Nil	Nil	37	—	—
Callender's	1	15	15	3 $\frac{7}{16}$	+$\frac{1}{16}$	4 14 4
Do. 6½% Pref.	1	6½	6½	31/3	+$\frac{1}{16}$	4 3 2
Crompton Parkinson Ord.	5/-	22½	—	18/3	—	6 5 7
Do. 8% Pref.	1	8	8	30/-	—9d.	5 6 8
Edison-Swan 1st Pref.	1	7½	7½	24/6	—	6 2 5
Do. 5% Deb.	Stock	5	5	102½	—	4 17 7
Electric Construction	1	Nil	Nil	8/9	—	—
Enfield Cable Ord.	1	25	25	91/3	—	5 9 8
English Electric	1	Nil	Nil	10/-	—	—
Do. do. Pref.	1	Nil	Nil	15/-	—	—
Ever Ready	5/-	35	35	29/-	—	6 0 8
Ferranti Pref.	1	7	7	27/-	+9d.	5 3 8
G.E.C. Pref.	1	6½	6½	29/6	—	4 8 2
Do. Ord.	1	8	8	45/-	+6d.	3 11 0
Henley's	1	30	30	6 $\frac{7}{16}$	+$\frac{1}{16}$	4 13 4
Do. 4½% Pref.	5	4½	4½	5½	—	4 5 9
India-Rubber	1	Nil	Nil	3/3	—	—
Johnson & Phillips	1	5	5	22/-	—	4 11 0
Siemens Ord.	1	7½	6½	24/6	—	5 6 0
Telegraph Construction	£1	Nil	Nil	23/9	—	—

* Dividends paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1931

34146. "Track circuit signalling systems for railways." British Power Railway Signal Co., Ltd., S. L. Glenn, H. Tinsley, and D. C. Gall (trading as Tinsley & Co.). December 8th, 1932. (398252.)

1932

6220. "Retroactive thermionic valve systems." J. Robinson and British Radiostat Corporation, Ltd. March 1st, 1932. (398170.)

6242. "Electric circuit breakers." W. B. Whitney, E. B. Wedmore, and British Electrical & Allied Industries Research Association. March 1st, 1932. (Cognate applications, 12910/32, 17314/32, and 17315/32.) (398213.)

6249. "Recording apparatus." General Electric Co., Ltd., and G. Chelioti. March 1st, 1932. (398214.)

6858. "Remote control and remote signalling systems." International General Electric Co., Inc. March 6th, 1931. (398220.)

6910. "Radio receiving apparatus." Westinghouse Brake & Saxby Signal Co., Ltd. May 27th, 1931. (398202.)

6963. "Coil loaded submarine signalling cables." Standard Telephones & Cables, Ltd., T. N. Riley, R. L. Hughes, and R. A. L. Cole. March 8th, 1932. (398206.)

7051. "Insulated electric conductors." E. I. du Pont de Nemours & Co. March 11th, 1931. (398225.)

7109. "Television." Electric & Musical Industries, Ltd., and C. O. Browne. March 9th, 1932. (398228.)

7115. "Sound-measuring systems." Western Electric Co., Ltd. (Bell Telephone Laboratories, Inc.). March 9th, 1932. (398229.)

7173. "Electric current generators." J. Lucas, Ltd., E. O. Turner, and S. A. Mason. March 10th, 1932. (398233.)

7236. "Electrical indicating devices." Electrical Research Products, Inc. March 16th, 1931. (398238.)

7286. "Vacuum tube circuits for electrical signalling systems." Standard Telephones & Cables, Ltd. August 31st, 1931. (398240.)

7287. "Train describing systems or train indicating systems which comprise a plurality of register devices adapted to be taken into use in rotation." Standard Telephones & Cables, Ltd., and J. B. Griffiths. March 11th, 1932. (398241.)

7294. "Television and like apparatus." Fernseh Akt.-Ges. March 12th, 1931. (398242.)

7369. "Mirror wheels for use in picture telegraph, television and like scanning systems." Marconi's Wireless Telegraph Co., Ltd., N. Levin and L. E. Q. Walker. March 11th, 1932. (398247.)

7597. "Carrier arms for electric pick-ups for gramophones." C. G. Hibbard. March 15th, 1932. (398262.)

7714. "Ultra-short wave systems and electric discharge devices therefor." Radio Patents Corporation and H. E. Hollmann. March 23rd, 1931. (398263.)

8037. "Magnetic systems particularly applicable to loud-speakers." K. C. Peggs. March 18th, 1932. (398265.)

8334. "Automatic or semi-automatic telephone systems." General Electric Co., Ltd., J. E. Collyer, and B. F. Moss. March 21st, 1932. (398270.)

10043. "Lighting installation for cycles." F. Quast. April 7th, 1932. (398277.)

10381. "Method of, and means for, operating signalling or switch constructions by means sensitive to light." Magyar Wolfram Lampa-Gyar Kremenezky Janos Reszveny-Tarsasag. April 8th, 1931. (398278.)

10718. "Electric traction control mechanism." International General Electric Co., Inc. April 14th, 1931. (398281.)

14051. "Enclosed electric arc devices." British Thomson-Houston Co., Ltd., R. F. Strickland, H. D. Blake, and S. McLean. May 19th, 1931. (398290.)

14654. "Wireless condenser dials." W. Yates. May 23rd, 1932. (Addition to 376510.) (398292.)

16490. "Remote control systems." International General Electric Co., Inc. June 10th, 1931. (Addition to 398220.) (398304.)

17414. "Instrument for indicating the transverse position corresponding to the state of movement, and the direction of travel above ground, for air and water craft with gyroscope pendulum." Ges. für Elektrisch Apparate. June 20th, 1931. (Addition to 371235.) (398311.)

20762. "Electric tumbler switches." E. R. Bain and N. Allday. March 11th, 1933. (398322.)

21192. "Brush-shifting gear for dynamo-electric machines." English Electric Co., Ltd., and R. D. Ball. July 27th, 1932. (398325.)

21750. "Conversion of continuous current of a given voltage into current of another voltage." Akt.-Ges. Brown, Boveri et Cie. August 3rd, 1931. (398327.)

22382. "Selecting switches for automatic telephone and like selective systems." Siemens Bros. & Co., Ltd., and H. E. Humphries. August 10th, 1932. (398335.)

24410. "Selectively responsive electric thermal switches particularly for remote control." British Thomson-Houston Co., Ltd. September 1st, 1931. (398341.)

29542. "Connecting cables in ignition systems of internal combustion engines." G. Steiner. October 24th, 1931. (398356.)

31937. "Static frequency-changing systems." English Electric Co., Ltd., and H. Rissik. November 11th, 1932. (398364.)

32148. "Control apparatus for vehicles of the Diesel electric type." Sulzer Frères Soc. Anon. November 24th, 1931. (398365.)

33166. "Apparatus for charging the storage batteries of automobile vehicles." L. H. Peter and Westinghouse Brake & Saxby Signal Co., Ltd. November 23rd, 1932. (398368.)

34962. "Electron discharge timing devices." Igranic Electric Co., Ltd. December 10th, 1931. (Addition to 370002.) (398377.)

1933

744. "Arrangements for controlling motors in electric traction systems." L. Bacqueyrisse. January 30th, 1932. ((398383.)

1667. "Clock-operated electric switches." E. H. Charsely. January 18th, 1933. (398387.)

2783. "Electrostatic precipitation apparatus." Soc. Industrielle d'Applications Electriques. January 29th, 1932. (398394.)

4229. "Wireless receiving apparatus." Dr. S. Loewe. February 13th, 1932. (398400.)

6438. "Pressure wave or vibration generators suitable for use in submarine signalling and for like purposes." C. L. Florission and Soc. de Condensation et d'Applications Mécaniques. May 20th, 1932. (398418.)

8850. "Electric measuring instruments." H. Tinsley and D. C. Gall (trading as H. Tinsley & Co.). March 23rd, 1933. (398433.)

9943. "Electric welding machines." M. Charlier. April 5th, 1932. (398442.)

11118. "Grid-pasting machines particularly for use in connection with storage battery plates." W. J. Tennant (Monarch Battery Co., Inc.). August 3rd, 1932. (Divided application on 398328.) (398450.)

11985. "Electric commutator or the like having brushes consisting of conductive liquid jets." J. F. G. P. Hartmann. May 21st, 1932. (398455.)

22663. "Electric circuit breakers." W. B. Whitney, E. B. Wedmore, and British Electrical & Allied Industries Research Association. March 1st, 1932. (Divided application on 6242/32.) (398249.)

22721. "Alternating current circuit breakers." W. B. Whitney, E. B. Wedmore, and British Electrical & Allied Industries Research Association. March 1st, 1932. (Cognate application 22722/33.) (Divided application on 6242/32.) (398207.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from September 27th:—

Zelos. No. 543397. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—Graham Farish, Ltd., 153, Mason's Hill, Bromley, Kent.

Fanfare. No. 543842. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—Fanfare Radio, Ltd., Cameron Road, Chesham, Bucks.

Uniplug (lettering and design). No. 539044. Class 13. Insulated couplings for connecting heating, lighting, and like electrical apparatus.—Armando Cigarini, 34, Harrington Road, South Kensington, S.W.7.

Salora. No. 543242. Class 13. Electric lamps (ordinary) and electric lighting fittings.—Salora Lights, Ltd., 52, Guildhall Buildings, Navigation Street, Birmingham.

Beeantee. No. 543361. Class 50. Insulating parts of electric lighting fittings made of synthetic resin.—"Beeantee" Illuminations, Ltd., 70, Banner Street, Bunhill Row, E.C.1.

Conditions in Roumania

NO improvement last year in Roumania's general position is indicated by Mr. R. J. E. Humphreys, Commercial Secretary to H.M. Legation at Bucharest, in a Department of Overseas Trade report on financial and economic conditions in that country (H.M. Stationery Office, 2s. 6d.).

In spite of an active trade balance the State revenues declined, and although the leu was maintained on the gold standard, foreign credits were restricted. The control of exchange operations was first introduced in May, 1932, and the quota system was initiated towards the end of the year, a considerable diminution of trade resulting.

So far, however, British trade has not suffered from the new regime, since the United Kingdom is one of those countries with whom Roumania had a favourable trade balance and which were informed officially or semi-officially that the new quota system would have no detrimental effect on the volume of exports to Roumania. In fact even before the introduction of the quota system imports from the United Kingdom had begun to increase steadily, partly as a result of a depreciation of sterling and partly as a consequence of the determination of the British trader to make use of the opportunity thus offered him.

Turning to electrical imports, Mr. Humphreys says that large quantities were imported almost exclusively from Germany, though Austria supplied some; fairly large quantities of telephone materials and cables came from the United Kingdom.

Recently the radio apparatus market has been captured chiefly by Germany, and shared by the United States, Holland and Austria, the United Kingdom being among the smaller suppliers; the bulk of the accessory materials comes from Germany. Sales of radio sets are said to have fallen off during the year under review owing to a further decline in the purchasing power of the population, and importation has accordingly been greatly reduced. Roumania has at the moment only one broadcasting station, but a suggestion has recently been put forward for the construction of another transmitter with a power of 150 kW at Blaj; an extension of opportunities in the radio market in the near future seems probable for this and other reasons.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Abergavenny.—Houses (30); R.D.C. surveyor.

Barking.—Houses (491); borough engineer. Houses (193), Manor Farm Estate; J. R. Leftley. Factory extensions, Abbey Road; Chemical Supply Co., Ltd. Shops, &c., Longbridge Road and Upney Lane; Hardmans Estates, Ltd.

Bath.—Public lavatories, Terrace Walk (£8,966); Messrs. Toogood, builders, Kingston Road.

Beckenham.—Schools (250 places), Eden Park, for E.C.; director of education.

Bedford.—Houses (24), Irwin Road; H. C. Janes, Ltd. Houses (100), London Road Estate (£28,720); J. Aston & Son. Alterations and additions, 64, St. Loyes Street, for Liverpool Victoria Friendly Society; F. Gray.

Birmingham.—School, Lyttleton Road, Stechford, and shops and house, Hagley Road West, Quinton, with electrical work; F. C. Wiltshire, town clerk, Council House. Reconstruction of 19, Hagley Road, Bearwood, with electrical work (£3,000); Harris & Sheldon, Ltd., builders, Stafford Street.

Blandford.—Post office for H.M. Office of Works, King Charles Street, London, S.W.

Blyth.—Bathing pool (£35,000); L. Leeper, borough engineer.

Bootle (LANCS).—Catholic church (£6,500), with electrical work; Rev. Father R. Coupe.

Bridlington.—Central schools (£18,655) for Borough E.C.; P. M. Newton, architect. Entertainment pavilion, The Parade; borough surveyor.

Brighton.—Houses (486) and flats (88), Nelson Row area; borough engineer. Houses (18), Bevendean Estate; W. A. Gates & Sons, Ltd. Houses (46), Patcham & Falmer, and development of Brighton Heights Estate, also premises, Prince's Place (£30,000); Messrs. Braybons, builders.

Bristol.—Library, Sea Mills (£2,324); F. Wilkins.

Burnley.—Junior school, Cherry Fold, for Borough E.C.; director of education.

Carlisle.—Extensions to the Cumberland Infirmary (£50,000); S. W. B. Jack, architect, Lloyds Bank Chambers.

Chelmsford.—Market extensions (£4,957); F. J. French. School (184 places), Catholic school site, for E.C. Extensions, 48, High Street; Nelson, Murdock & Co., Ltd.

Coventry.—Factory, Parkside, for Arthur Davies & Sons, Ltd.; John P. Osborne & Son, architects, 95, Colmore Row, Birmingham. Reconstruction of Gosford Street Baptist Chapel, with electrical work (£5,000); J. H. Gilbert, architect, 9, Hay Lane.

Dewsbury.—Methodist church, Kilpin Hill (electrical work); Stead & Walshaw, architects, Heckmondwike. Extensions, works and offices, for A. Harrison & Sons (Dewsbury), Ltd.; Samuel Stott & Son, builders, Bank Top.

Droitwich (WORCESTERSHIRE).—Reconstruction of Salter's Hall Cinema, with electrical work (£10,000); Parsons & Morrin, builders, Belgrave Road, Birmingham.

East Dean (GLOS).—Houses (60); R.D.C. surveyor.

Enfield.—Houses (39), Landra Gardens; Geo. W. Newman. Houses (48), Oatlands Gardens, &c.; Oatlands Estate, Ltd. Houses (25), Unity Road; Bethell & Swannell.

Glasgow.—Child welfare centre, Carneadhill (£17,500); city architect. New schools (£574,000) for E.C.

Grantham.—Houses (122); Jaques & Greeves, Ltd., builders, Doncaster.

Greasborough.—Houses (50); G. W. Meanley & Sons, builders, Doncaster.

Hereford.—Houses (85); city engineer.

Hetton-le-Hole.—Houses (438); A. H. Fennell, architect, Bridge End Chambers, Chester-le-Street.

Hexham (NORTHUMBERLAND).—Houses (60); U.D.C. surveyor.

Hornchurch.—Bazaar premises, High Street, for F. W. Woolworth & Co., Ltd., London.

Huddersfield.—Garage for Berry Brow Co-operative Society, Ltd., Waingate Berry Brow; H. G. Lockwood, builder, Freehold Mills, Berry Brow.

Hyde.—Alterations and additions to Newton Mill for Jacobson Welch & Co., Ltd.; Wellerman Bros., Ltd., builders, Edward Street.

Kidderminster.—Houses (100); borough surveyor. Houses (50); William Cooper & Sons, builders, Blackheath.

Lancaster.—Houses (353); borough engineer.

Lincoln.—Rebuilding of St. Peters-at-Arches Church, with electrical work (£12,000); Wm. Wright & Son (Lincoln), Ltd., builders, Park Street.

Liverpool.—Houses (24), Abbeystead Road; Sealey & Lucas, builders, Gwndrin Road. Houses (33), Cherry Lane, for Thomas Perry, Ltd., 14, Dale Street; W. T. Clarke, architect, 9 Redcross Street. Houses (136), Moss Pits Lane; Quiggin & Gee, architects, 24, North John Street. Houses (20), Oakhill Road; O. Williams & Sutcliffe, architects and surveyors, 6a, Temple Dale Street. Flats (25), electrical work, Ulletts Road and Linnett Lane; Hosking & Co., architects, 46, Fenwick Street. School, Longmoor Lane, Fazakerley (£10,000), with electrical work; Rimmer Bros., builders, Dalton Street. Extensions, J. H. Robinson & Co. (Liverpool), Ltd., Mill Lane (£5,000), with electrical work. Reconstruction of dairy, Laurel Road, for Walker's Dairies, Ltd., 6, Laurel Road; H. F. Marshall, architect, Lyngrove, Whitehedge Road, Cressington.

London.—(BATTERSEA).—Tenements, York Road; Works department. (BERMONDSEY).—Flats, Tanner Street and Whites Ground (£32,000); Works department. Alterations to Alaska Works, Woodlands Place; C. W. Martin & Sons, Ltd. (BROCKLEY).—Four shops, Brockley Road; Wates, Ltd. (EAST HAM).—Houses (89), Bye Pass Road; R. J. Slater, architect. Houses (32) and flats, Gooseley Lane (£11,163); borough engineer. Houses (20), Grantham Road; Pitt & Prior Hale, architects. Houses (56), Walton Road; W. Goodchild & Co. Factory extensions, High Street, for Burgoyne, Burbridges & Co., and at houses, Park Avenue; Wheeler & Wheatley. Two shops and club, 498-504, High Street; F. H. Cleathero. (FOREST HILL).—Houses (29), Westwood Park; H. Macintosh. Shops and flats, 237-9, Stanstead Road; E. C. Christmas. (HAMMERSMITH).—Blocks of flats, Richford Street and Wells Road; M. Rosensuer. (LEWISHAM).—Houses (20), Canobie Road; Snow Bros. Houses (30), Chudleigh Road; J. W. Heath & Sons. Additions to 26-8, London Road; F. W. Woolworth & Co., Ltd. (POPLAR).—Flats (78), Emmett Street, and at Old Ford Road (£46,000); borough engineer.

Maidstone.—Houses (90), Ringlestone Estate; borough surveyor. Flats (£4,926); Martin & Newman, builders. Electricity works stores and offices (£9,694); Wallis & Sons, Ltd., builders.

Mansfield.—Depôt, Sutton Road; Midland General Bus Co., Ltd.

Middlesbrough.—Alterations and additions to the West Lane Hospital; S. E. Burgess, borough engineer, Town Hall.

Middleton (YORKS).—Church, Middleton (£10,000); J. T. Wright & Sons, builders, Skinner Lane, Leeds.

Newbury.—Estate development, Andover Road; Newbury Hills Estate, Ltd.

Newcastle-on-Tyne.—Houses (22), Woodburn Avenue and Wingrove Road; Watson & Scott, architects, 16, Pilgrim Street. New branch premises, Armstrong Road, for the Co-operative Society; C.W.S. Architects' department, 90, Westmorland Road. Extensions to C. A. Parsons & Co.'s premises, Shields Road; D. K. Gourley, Ltd., builders, Shields Road.

Northumberland.—School, Bedlington, for the E.C.; W. W. Tasker, county architect, 17, Claremount Place, Newcastle-on-Tyne.

Padiham (LANCS).—Houses (28), Abingdon Street; U.D.C. surveyor.

Paisley.—New wing to public library (£4,000); burgh surveyor.

Penkhull.—Houses (72), Newcastle Road; J. W. Thornley & Sons, Stoke-on-Trent.

Pershore (WORCESTERSHIRE).—Houses (12); M. E. Sheath, architect, Defford.

Petersfield (HANTS).—Public hall and council offices; U.D.C. surveyor.

Rawtenstall.—Houses (50), Prospect Road and Adelaide Street; borough engineer.

Scarborough.—Houses (50); borough surveyor.

Selby (YORKS).—Houses (26); Squires & Sons, builders.

Shipley.—Houses (60), Crag Road (£18,450); U.D.C. surveyor.

Sittingbourne & Milton Regis.—Houses (83); U.D.C. surveyor.

South Shields.—Houses (22) for aged people; W. D. Allison, builder, Whitburn.

Stockport.—Houses (60), Petersburg Road, Edgeley, for J. Gerrard & Sons, Ltd., Pendlebury Road, Swinton. Branch bank, 24, High Street, Cheadle, for Stockport Savings Bank, 43, Lower Hillgate; Hibbert & Penn, builders, Princess Street.

Sunderland.—Houses (500), near Miere Knolls Cemetery; T. H. D. Hedley, architect, 49, Frederick Street.

Teddington.—Maisonettes (£7,650); Modern Construction Co., builders.

Torquay.—Showrooms, Brunswick Square; T. Brown & Son. Alterations and additions to 4, Fore Street; National Provincial Bank.

Tunstall.—Conversion of Rollo Skating Rink into cinema; Skating Rink Co.

Tynemouth.—Houses (216), (£71,000); borough engineer. Senior school, Chirton Farm site, North Shields (£42,900), for E.C. School extensions, West House, Newcastle Terrace; W. Stockdale, architect.

Wallasey.—Baths (£69,993); Wm. Tomkinson & Sons, Liverpool. School, Danger Lane; Catholic trustees.

Walsall.—Arcade and Central Omnibus Garage, Park Street and St. Paul's Street (£31,968); borough surveyor.

Warrington.—Houses (112), Bewsey Estate (£32,885); borough engineer. Houses (146), Westy Lane Estate; Clough & Gaskell, Ltd. Works extensions, Howley; J. Chadwick & Sons.

Whickham-on-Tyne.—Houses (50); Dockendale Estate; S. J. Stephenson, architect, 2, Saville Place, Newcastle-on-Tyne. Houses (70), Market Lane; Shield Bros., builders, Swalwell.

York.—Houses (32), Kilburn Park Estate; J. Foster. New premises, Coney Street; Leak & Thorp, Ltd.

Economic Conditions in Norway

THE Department of Overseas Trade has issued a report prepared by the Commercial Secretary at Oslo on the economic situation in Norway during the eighteen months ended June 30th last. Dealing with trade generally the report states that in the machinery section unfavourable conditions have prevailed, but there has perhaps been a somewhat larger demand for special machinery on the part of the few concerns which are in a position to modernise their plant. Norwegian electricity works, with a superfluity of power of which they find it difficult to dispose, have in a number of instances undertaken to supply, for industrial purposes, steam produced by means of electric boilers at the same price as steam produced by the use of coal. In some cases the electric boilers are installed by the electricity works, in others by the consumers of the steam. Until the demand for electrical energy increases, this tendency seems likely to have an adverse effect on the market for coal. An interesting feature of recent developments is the enterprise displayed by certain concerns in finding new markets to replace old ones closed by trade barriers and in entering new fields of production. Among the articles of which the manufacture has lately been commenced are drawn wire electric lamps.